A Dissertation in General Surgery

A COMPARATIVE STUDY OF PRESERVATION OR ELECTIVE DIVISION OF ILIO INGUINAL NERVE IN LICHENSTEIN'S MESH REPAIR IN POST OPERATIVE PAIN PERCEPTION

Dissertation submitted to

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

with fulfillment of the regulations
for the award of

MS DEGREE IN GENERAL SURGERY

BRANCH I

GOVT KILPAUK MEDICAL COLLEGE,

CHENNAI

MAY 2018

DECLARATION BY THE CANDIDATE

I Solemnly declare that the dissertation titled **"A COMPARATIVE STUDY OF PRESERVATION OR ELECTIVE DIVISION OF ILIO INGUINAL NERVE IN LICHENSTEIN'S MESH REPAIR IN POST OPERATIVE PAIN PERCEPTION"** was done by me at Kilpauk medical college and hospital, Chennai during the period from FEBRUARY 2017 to SEPTEMBER 2017 under the direct guidance and supervision of **Prof. Dr. V. RAMALAKSHMI, M.S.,** and **Prof. Dr. R .KANNAN M.S.**

The dissertation is submitted to the Tamilnadu Dr. M.G.R. medical university towards the partial fulfillment of the requirement for the award of M.S.DEGREE IN GERENAL SURGERY BRANCH- I.

Place

Date **Dr.M.PRIYA**

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BONAFIDE CERTIFICATE

Certified that this is the bonafide dissertation done by

Dr.M.PRIYA

and

Submitted in partial fulfillment of the requirements for the

Degree of M.S., General Surgery, Branch I of

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ETHICAL COMMITTEE

INSTITUTIONAL ETHICS COMMITTEE
GOVT. KILPAUK MEDICAL COLLEGE,
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Protocol ID. No.17/2017 Meeting held on 20/01/2017
CERTIFICATE OF APPROVAL

The Institutional Ethical Committee of Govt. Kilpauk Medical College, Chennai reviewed and discussed the application for approval "**A Study of Preservation or Elective Division of Iliioinguinal Nerve in Lichenstein's Repair.** " submitted by Dr.M.Priya, Postgraduate in General Surgery, Govt. Royapettah Hospital, Govt. Kilpauk Medical College, Chennai.

The Proposal is APPROVED.

The Institutional Ethical Committee expects to be informed about the progress of the study any Adverse Drug Reaction Occurring in the Course of the study any change in the protocol and patient information /informed consent and asks to be provided a copy of the final report.

DEAN 13/2/17
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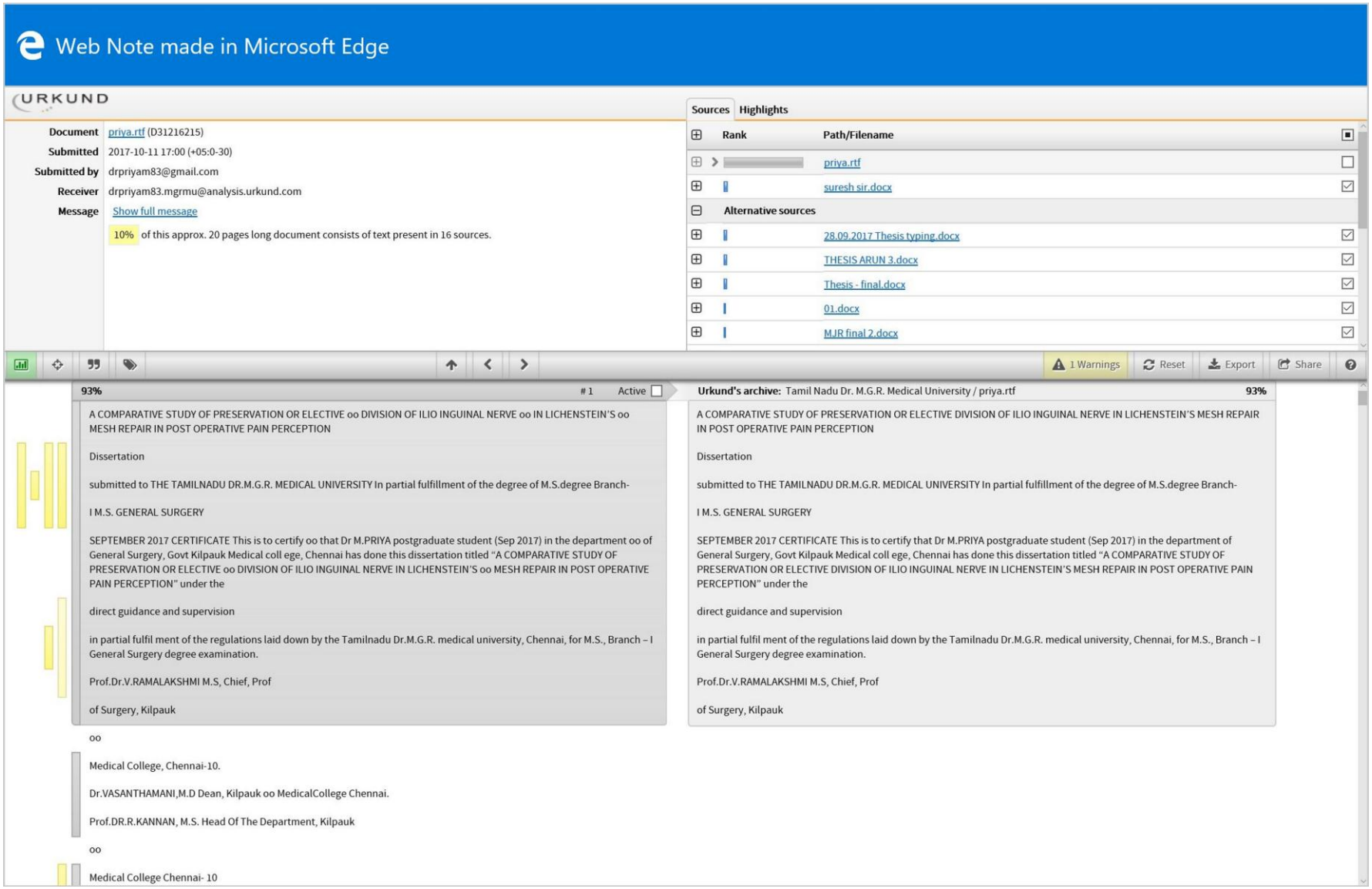
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ABSTRACT

A. NEED FOR THE STUDY:

As post-operative chronic pain following inguinal hernia repair is proposed to be due to nerve entrapment and prophylactic neurectomy can reduce the pain, this study was conducted to find out the effectiveness of post neurectomy pain perception.

B. Aim of the study:

To study the effect of elective neurectomyin post operative pain perception following lichenstein's mesh repair

C. Methods-

All male patients who are fit to undergo elective surgery with in the age of 18-70 years with unilateral inguinal hernia with no complications were taken for the study.

Over a period of six months 50 patients were randomly divided into two equal groups

Group i: (study group) were subjected to elective division of ilioinguinal nerve during Lichenstein's mesh repair

Group ii: (control group) were subjected to preservation of ilioinguinal nerve in lichenstein's mesh repair

D. Period of Study:

Jan 2017- August 1017

E. Type of Study:

comparative study

F. Sample Size: 50

G. Conclusion:

By analyzing the various data’s available, it is concluded that ilioinguinal neurectomy provides chronic pain relief in post lichenstein's mesh repair. Hence should be considered as a method in reducing post-operative inguinodynia .

Key Words

Lichenstein's mesh repair

Elective neurectomy

Inguinodynia

Ilioinguinal nerve

Comparative study

CONTENTS

INTRODUCTION

INTRODUCTION

Chronic groin pain is a significant problem following open inguinal hernia repair-lichenstein's ,mesh repair , with a reported incidence ranging from 18 to 60.9% (1-3).Though the pain is often mild in nature, the quality of life studies have shown that chronic pain, irrespective of severity, can significantly interfere with normal daily activities(4-5). Most often, the condition can sometimes be debilitating and treatment is often difficult and challenging.

The ilioinguinal nerve is a sensory nerve which innervates the skin over the groin region, the medial aspect of the thigh, the upper part of the scrotum and the penile root. It is normally encountered during open repair of inguinal hernia. Routiene surgical teaching dictates that the nerve has to be preserved at all times during repair because of the supposed morbidpity associated with cutaneous sensory loss and chronic groin pain following nerve injury.

However, some of the reports suggested that elective excision of ilioinguinal nerve causes minimal morbidities and was significantly not considered incapacitating by most patients (6,7). In addition to this, ilioinguinal neurectomy is a well-documented effective treatment of relieving chronic groin pain following open hernia repair, achieving more favorable outcomes than nerve block or mesh removal alone (8-10). More recently, retrospective studies have shown that elective excision of ilioinguinal nerve during hernioplasty were associated with a lower incidence of chronic groin pain of after the operation

(11-13).

In this trial, we have studied the effect of elective ilioinguinal neurectomy on the incidence and the severity of chronic groin pain after the inguinal hernia repair (Lichienstein's mesh repair) in a prospective randomized controlled manner.

AIM

AIM

The aim of this comparative study is to find out the role of prophylactic division of ilio inguinal nerve in reducing chronic post-operative pain following open hernia repair Lichenstein's mesh repair.

By electively dividing the iliinguinal nerve during lichenstein's mesh plasty repair, the post-operative outcome of chronic groin pain which is inguinodynia is reduced as per various studies.

This comparative study is conducted to test the effectiveness of ilioinguinal neurectomy in post-operative pain perception. We have also evaluated the groin numbness which is a possible outcome of this neurectomy. And to find out whether neurectomy is useful in reducing post-operative pain along with negligible groin numbness.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Hernia repair is one of the most common operations performed by general surgeons. Inspite of the frequency of this procedure, surgeons do not have ideal results and complications such as postoperative pain, nerve injury, infection, and recurrence continue to challenge surgeons.

DEFINITION

The term Hernia is derived from the Latin word for rupture. A hernia is defined as an abnormal Protrusion of an organ or tissue through the defect in its surrounding walls.

Although a hernia can occur at various sites of the body, these defects most commonly involve the anterior abdominal wall, particularly the inguinal region. Abdominal wall hernias occur only at sites where the a poneurosis and fascia are not covered by striated muscle.

These sites most of commonly include the inguinal, femoral, and umbilical areas, the linea alba, the lower portion of the semilunar line, and sites of prior incisions.

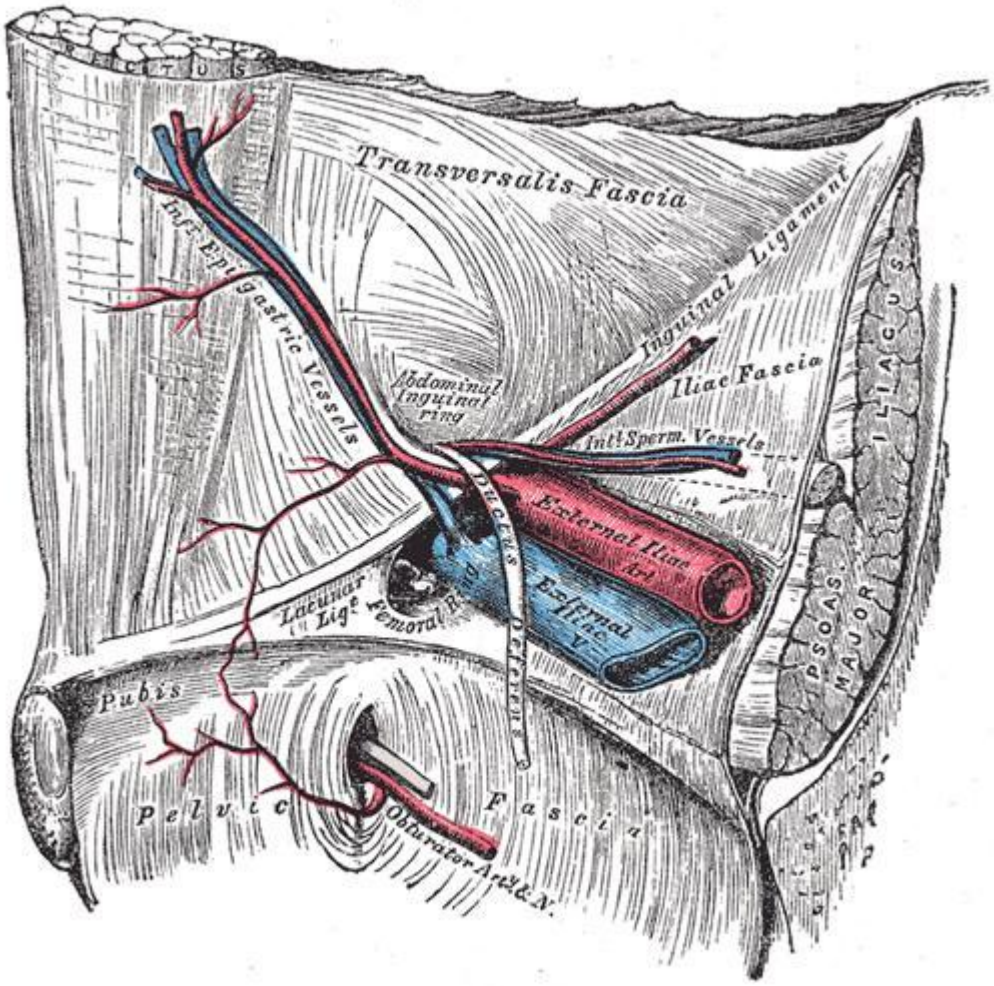
The so-called neck of orifice of a hernia is located at the innermost musculoaponeurotic layer, whereas the hernia sac is lined of by peritoneum and protrudes from the neck.

There is no constant consistent relationship between the area of a hernia defect and the size of a hernia sac. (20)

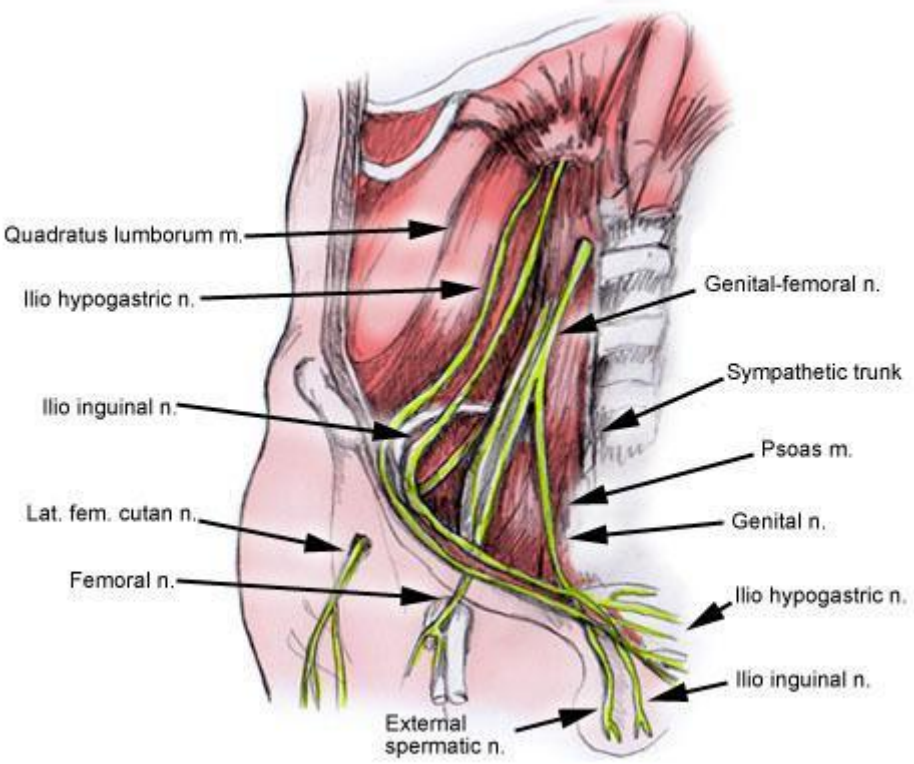
NERVES OF INGUINAL REGION

The ilioinguinal and iliohypogastric nerves often arise in common from the anterior rami of 12^{th} thoracic and 1st lumbar vertebrae 12^{th} thoracic nerve is to pierce the transversus abdominis muscle near the iliac crest. After Coursing of between the transversus abdominis muscle and the internal oblique for a short distance, the nerve pierces of the latter to travel under the external oblique fascia toward the external inguinal ring. It emerges of through the superior crus of the external inguinal ring to provide sensory innervation to the anterior abdominal wall in the hypogastrium.

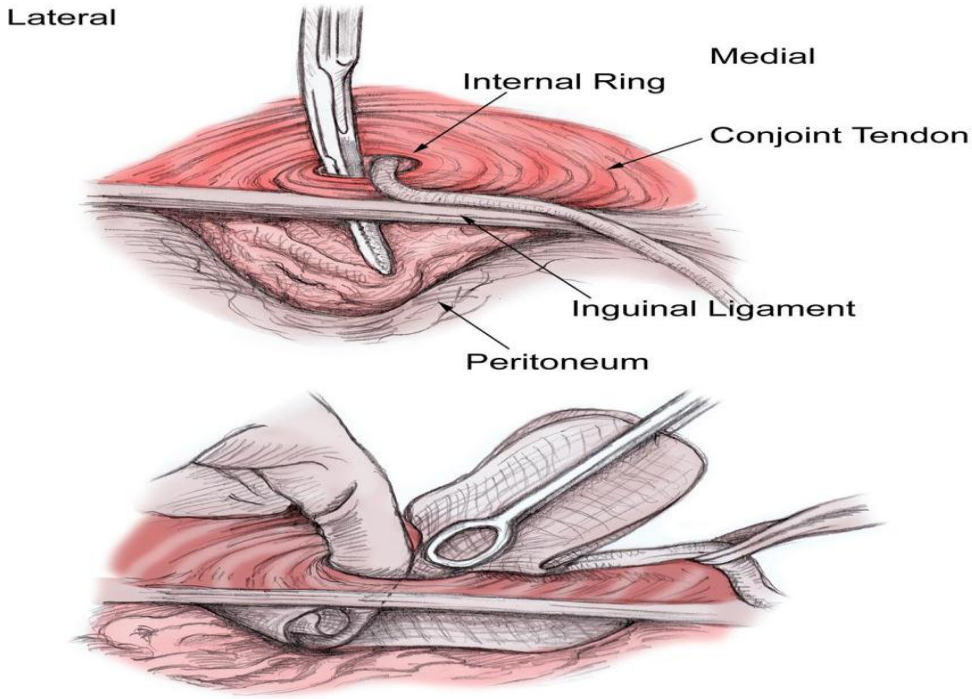
ANATOMY OF INGUINAL REGION



NERVES OF THE INGUINAL REGION



LICHENSTEIN'S MESHREPAIR



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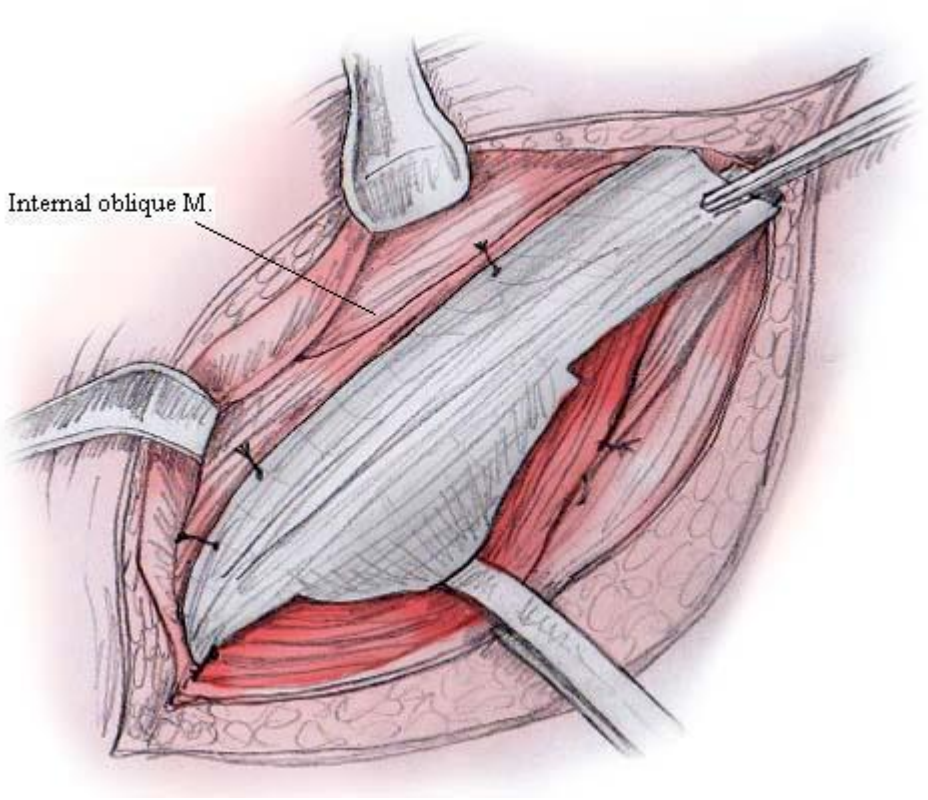
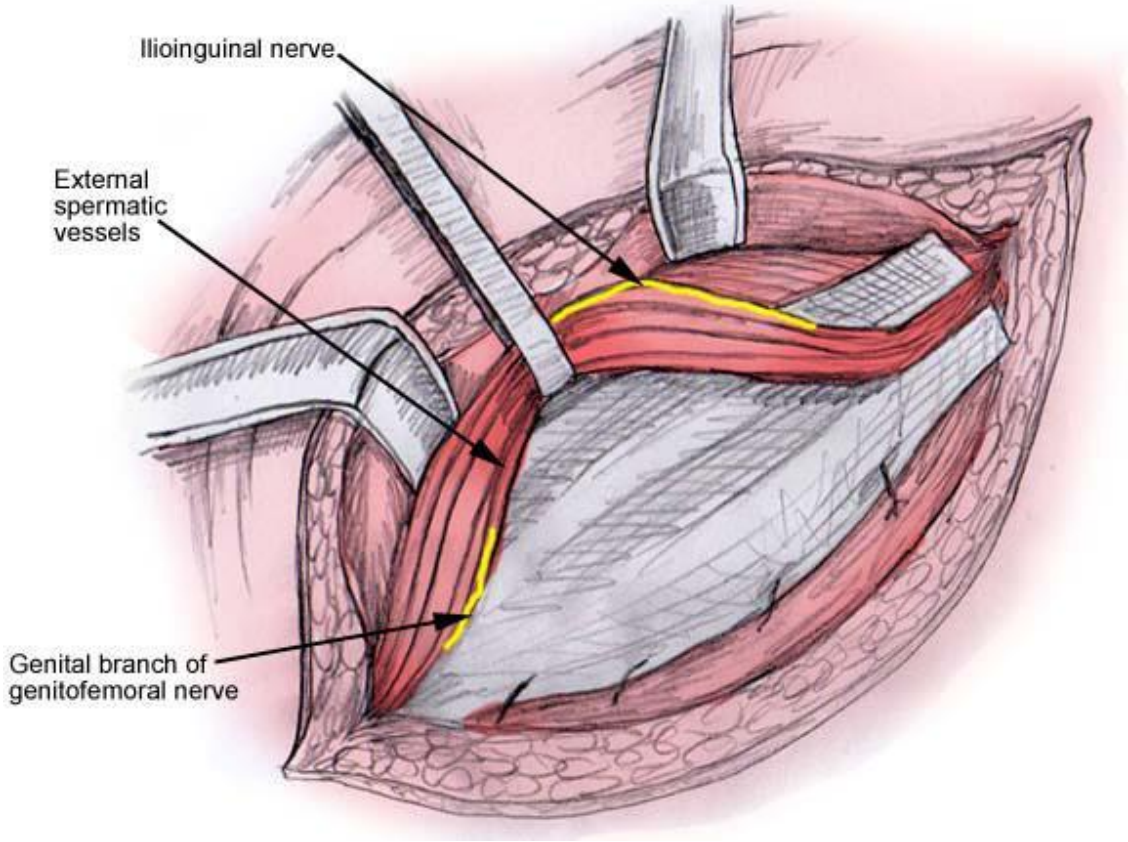


The ilioinguinal nerve courses of parallel to the iliohypogastric but closer to the inguinal ligament. Unlike the iliohypogastric nerve, the ilioinguinal nerve courses with the spermatic cord to emerge from the external inguinal ring, with it's the terminal branches providing sensory innervation to the skin of the inguinal region and of the scrotum or labium. The ilioinguinal nerve, iliohypogastric nerve, and genital branch of the genitofemoral nerve are commonly encountered during the performance of inguinal herniorrhaphy.

Hernias are a common problem however, their in true incidence is unknown.

ILIOINGUINAL NERVE



It is estimated of that 5% of the population will develop an abdominal wall hernia, but the prevalence may be even higher. About 75% in of all hernias occur in the inguinal region.

Two thirds of these are indirect, and the remainder of are direct inguinal hernias (20). Men are 25 times more likely to have a groin hernia of than are women. An indirect inguinal hernia is the most common hernia, regardless of gender. In men, indirect hernias predominate in over direct hernias at a ratio of 2 : 1. Direct hernias are very uncommon in women. The female-to-male as ratio in femoral and umbilical hernias, however, is about 10 : 1 and 2 : 1, respectively. Although as femoral hernias occur more frequently in women than in men, inguinal hernias will remain the most common hernia in women. Femoral hernias are rare in men. Ten percent of these women and 50% of men who have a femoral hernia as either have or will develop an inguinal hernia (20).

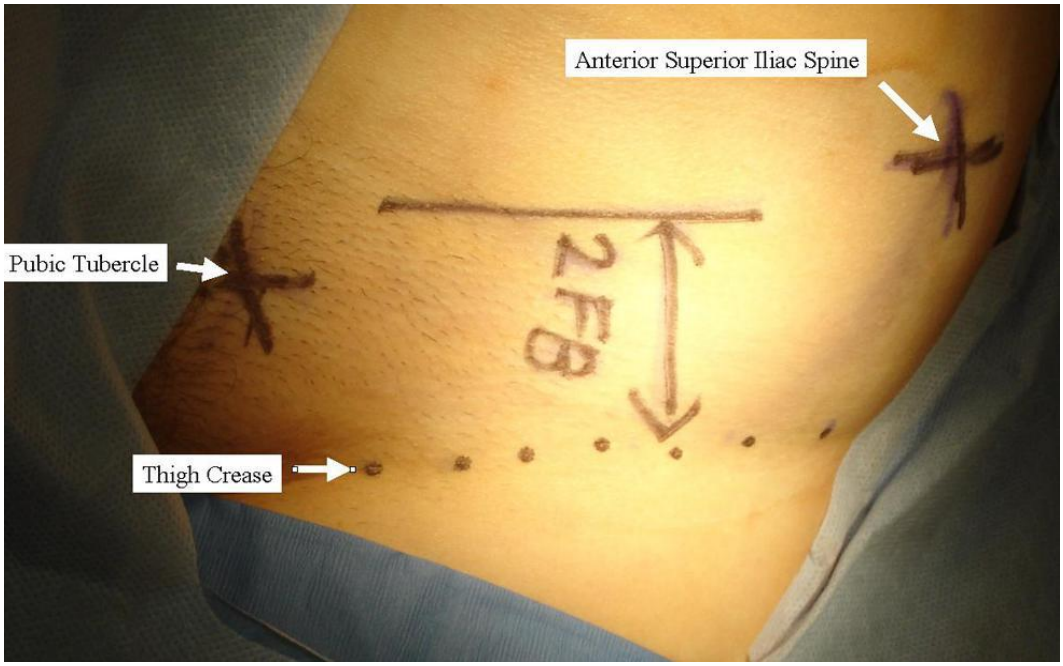
Both indirect inguinal and femoral hernias as occur more commonly on the right side. This is attributed to a delay in atrophy of the processes vaginalis after the normal slower descent of the right testis and to the scrotum during fetal development. The predominance of right-sided femoral hernias is thought to be due to the tamponading in effect of the sigmoid colon on the left femoral canal (20).

The prevalence of hernias increases as with age, particularly for the inguinal, umbilical, and femoral hernias. The likelihood of strangulation and need for hospitalization also increase with as aging. Strangulation, the most common serious complication of a hernia, in only 1% to 3% of groin hernias of and is more common at the extremes of life (20).

Most strangulated hernias are of indirect inguinal hernias; however, femoral hernias have the highest rate of strangulation (15%-20%) of all the hernias, and for this reason, it is recommended that all femoral hernias be repaired of at the time of discovery.

Inguinal Canal:

SURFACE MARKING OF INGUINAL CANAL

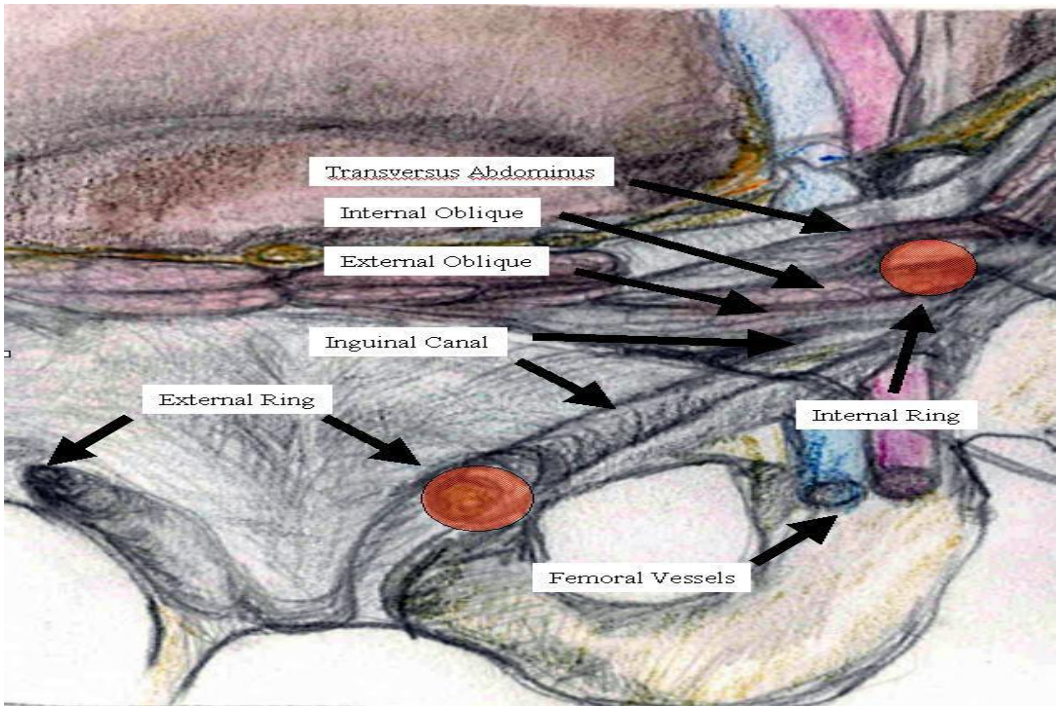


INGUINAL CANAL

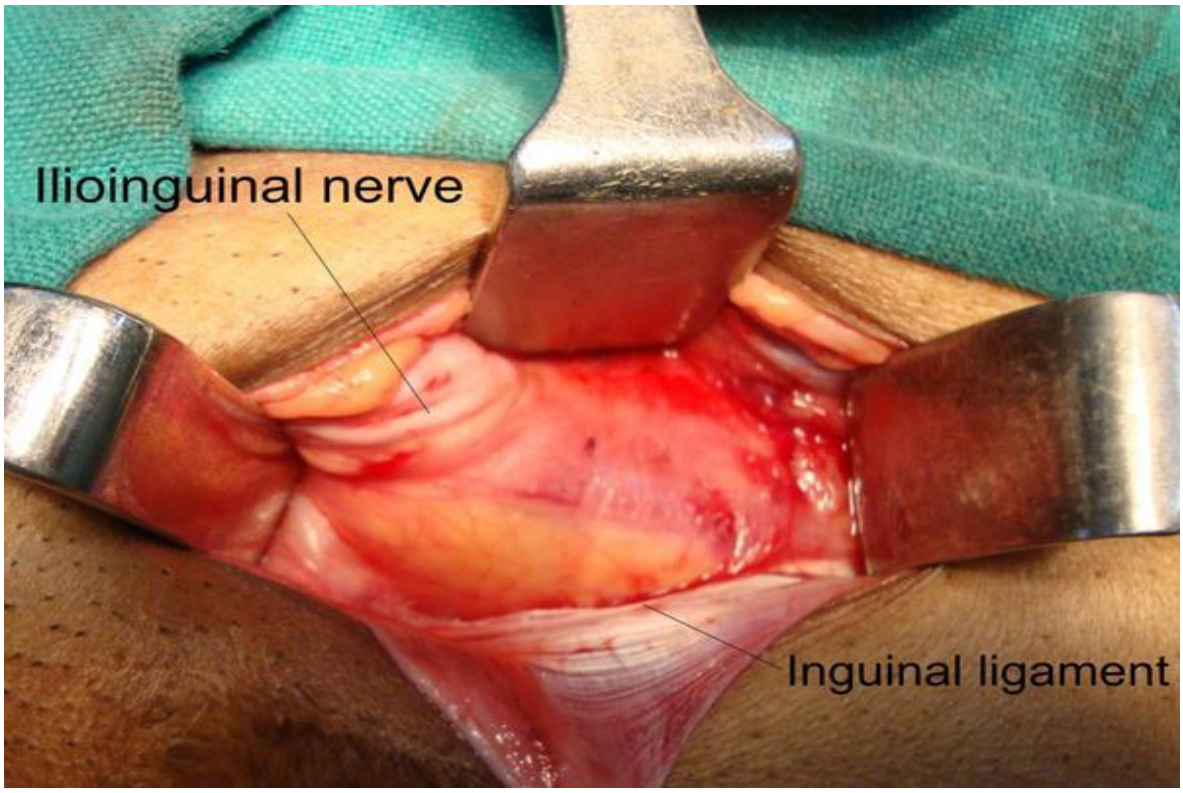
The inguinal canal is of about 4 cm in length and is located 2 to 4 cm cephalad to the inguinal ligament. The canal extends between the internal (deep) inguinal and external (superficial) ring it contains as the spermatic cord in males and round ligament of the uterus in females.

The spermatic cord is as composed of cremasteric muscle fibers, the testicular artery and accompanying veins, the genital branch of the genitofemoral nerve, and the vas deferens, the cremasteric vessels, the lymphatics, and of the processus vaginalis. The cremaster muscle arises from the lowermost fibers of the internal oblique muscle and also encompasses the spermatic cord in the inguinal canal. The cremasteric vessels are branches of the inferior epigastric vessels and pass through the posterior wall of the inguinal canal through their own foramen. These vessels often supply the cremaster muscle and can be divided to expose the floor of the inguinal canal during hernia repair without damaging the testis.

INGUIANL CANAL ANATOMY



ILIOINGUINAL NERVE



The inguinal canal is bounded of superficially by the external oblique aponeurosis. The internal oblique and transversus abdominis in musculoaponeurosis form the cephalad wall of the inguinal canal. The inferior wall of the inguinal canal is formed by the inguinal ligament and lacunar ligament. The posterior wall of floor of the inguinal canal is formed of by the transversalis fascia and the aponeurosis of the transversus abdominis muscle and by the internal oblique aponeurosis laterally.

Hesselbach's Triangle:

Hesselbach's triangle as it refers to the margins of the floor of the inguinal canal. The inferior epigastric vessels serve as its superolateral border, the rectus sheath as medial border, and the inguinal ligament as of the inferior border. Direct hernias occur within Hesselbach's triangle, whereas the indirect inguinal hernias arise lateral to the triangle. It is not uncommon, however, for the medium and large indirect inguinal hernias to involve the floor of the inguinal canal as they enlarge.

Nerves :

The iliohypogastric and ilioinguinal nerves and of the genital branch of the genitofemoral nerve are the important nerves at the groin area (Fig. 44-4). The iliohypogastric and ilioinguinal nerves provide sensation of the skin of the groin, the base of the penis, and the ipsilateral upper medial thigh. The iliohypogastric oo and ilioinguinal nerves lie beneath the internal oblique muscle to a point just medially and superior to the anterior superior iliac spine,

where they all penetrate the internal oblique muscle and lie beneath the external oblique aponeurosis. The main trunk of the iliohypogastric nerve runs of on the anterior surface of the internal oblique muscle and aponeurosis medial and superior to the internal ring. The iliohypogastric nerve may be provide an inguinal branch that joins the ilioinguinal nerve.

The ilioinguinal nerve often runs anterior to the spermatic cord in the inguinal canal and branches of at the superficial inguinal ring. The genital branch of the in genitofemoral nerve innervates the cremaster muscle and of the skin on the lateral side of the scrotum and labia.

This nerve lies on the in iliopubic tract and accompanies the cremaster vessels to form neurovascular bundle.

TREATMENT OF INGUINAL HERNIA

Most of surgeons recommend operation on discovery of a symptomatic inguinal hernia Because of the natural history of a groin hernia is in that of progressive enlargement and weakening, with the potential for incarceration and in strangulation. However, in patients with minimal symptoms, the clinician is in often faced with balancing the risk for hernia-related of complications such as hernia incarceration and bowel strangulation with the potential for complications in both the short and long term.

Fitzgibbons and colleagues recently reported the first of prospective randomized trial of a watchful waiting strategy for in patients with asymptomatic or minimally symptomatic inguinal hernias (21). This study

provides a conclusive evidence that a strategy of watchful waiting is safe for a elderly patients with asymptomatic or minimally symptomatic inguinal hernias, and that even though almost 25% of patients eventually undergo repair, when they do, the in operative risks and complication rates are no different than those of patients undergoing prophylactic repair.

Patients electing the non-operative management can occasionally have symptomatic improvements of with the use of a truss. This approach is more commonly used in Europe.

Correct measurement and fitting are important. Hernia control has been reported in about 30% of patients. Complications associated with the use of a truss include testicular atrophy, ilioinguinal or femoral neuritis, and hernia incarceration.

Operative Repair/Anterior Repairs:

Anterior hernia repairs are the most common operative approach for inguinal hernias. Tension-free repairs are now standard, and of there are a variety of different types. Older tissue types of repair are rarely indicated except for cases with simultaneous contamination or concomitant bowel resections when in placement of a mesh prosthesis may be contraindicated.

LICHENSTEIN'S TENSION FREE MESH REPAIR:

In the *Lichtenstein repair*, a piece of prosthetic in non-absorbable mesh is fashioned to fit the canal. A slit is cut into the distal, lateral edge of the mesh to accommodate the spermatic cord. There are a various preformed, commercially available prostheses available for use. Monofilament, non-absorbable suture is used in a continuous fashion beginning at the pubic tubercle of and running a length of suture in both directions toward the superior aspect in above the internal inguinal ring to the level of the tails of the mesh.

The mesh is sutured to the aponeurotic tissue overlying the pubic bone medially, in continuing superiorly along the transversus abdominis or conjoined tendon. The inferolateral edge of the mesh is sutured to the iliopubic tract of or the shelving edge of the inguinal (Poupart's) ligament to a point lateral to the internal inguinal ring. At this point, the tails created of by the slit are sutured together around the spermatic cord, as snugly forming a new internal inguinal ring. Cord structures and are passed through this newly fashioned internal inguinal ring.

INGUINODYNIA __(CHRONIC POST OP PAIN):

Postherniorrhaphy pain syndrome or inguinodynia is pain ordiscomfort lasting greater than 3 months after surgery of inguinal hernia patients present with neuralgia, parasthesia, hypoaesthesia, hyperaesthesia.

Postoperative pain is the significant problem after open inguinal hernia repair. Chronic groin pain is a significant problem following an open inguinal hernia repair, with a reported incidence ranging from 19% to 62.9% (1-3) Moderate or severe pain was in still present in 11% of patients during of and in 5% at rest 4 weeks after operation in the study by Callesen et al., (22). In the same group of patients, 19% reported some degree of pain at 1-year follow-up; the pain in was moderate or severe in 6% of cases. (23)

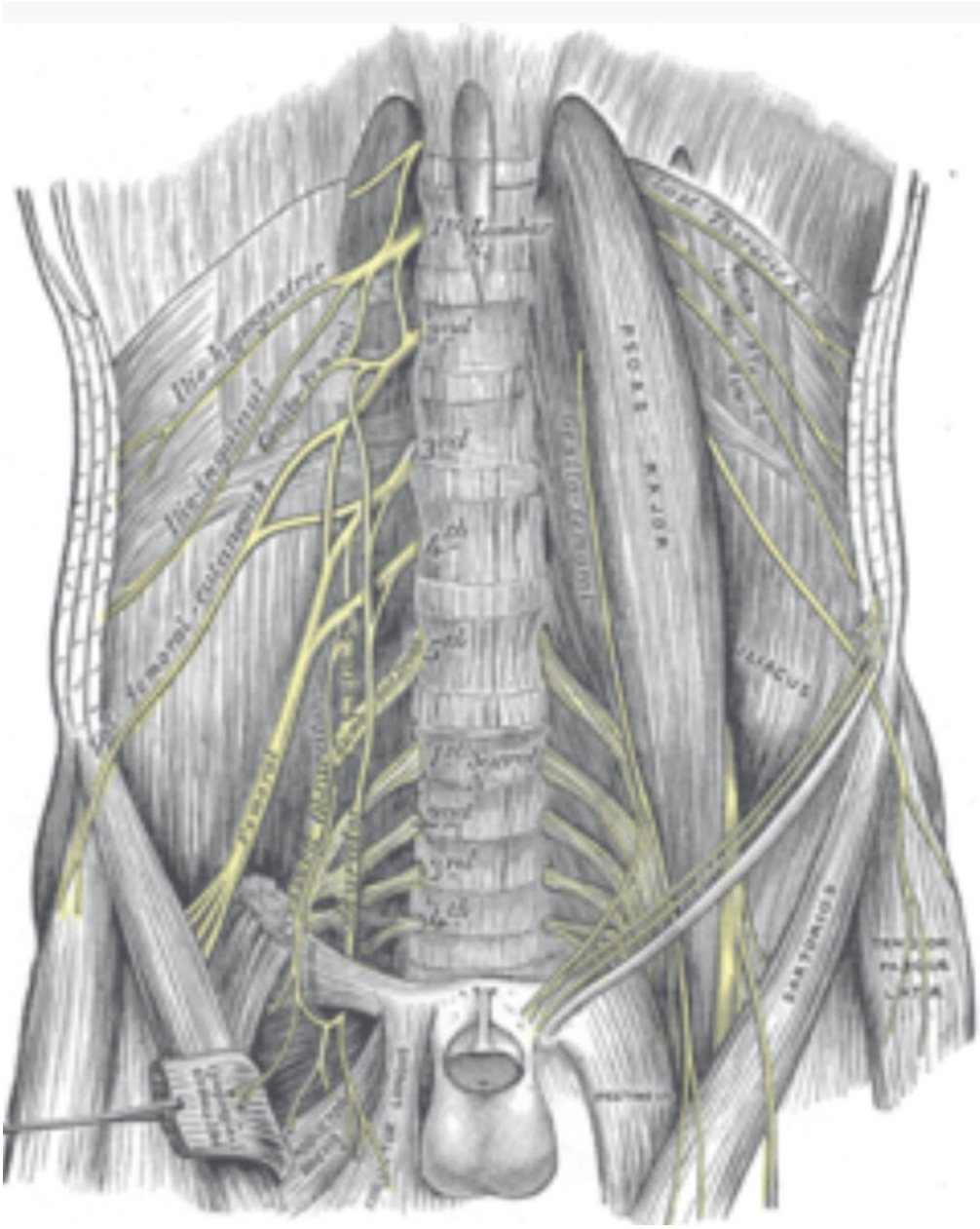
In a large-scale study, (24) chronic pain was present in 28.7% of patients 1 year after hernioplasty, leading to a some degree of functional impairment in 11% of patients. In another large-scale study, (25) chronic pain in was present in 43% of patients, and it was reported as severe or very severe in 3% of cases.

Chronic pain occurred in 30% of patients in the study of by Poobalan et al. (26) Tension-free repair of inguinal hernia with mesh prosthesis should lead to less postoperative pain. However, acute postoperative pain was similar in patients who underwent conventional or mesh hernia repair.(27)

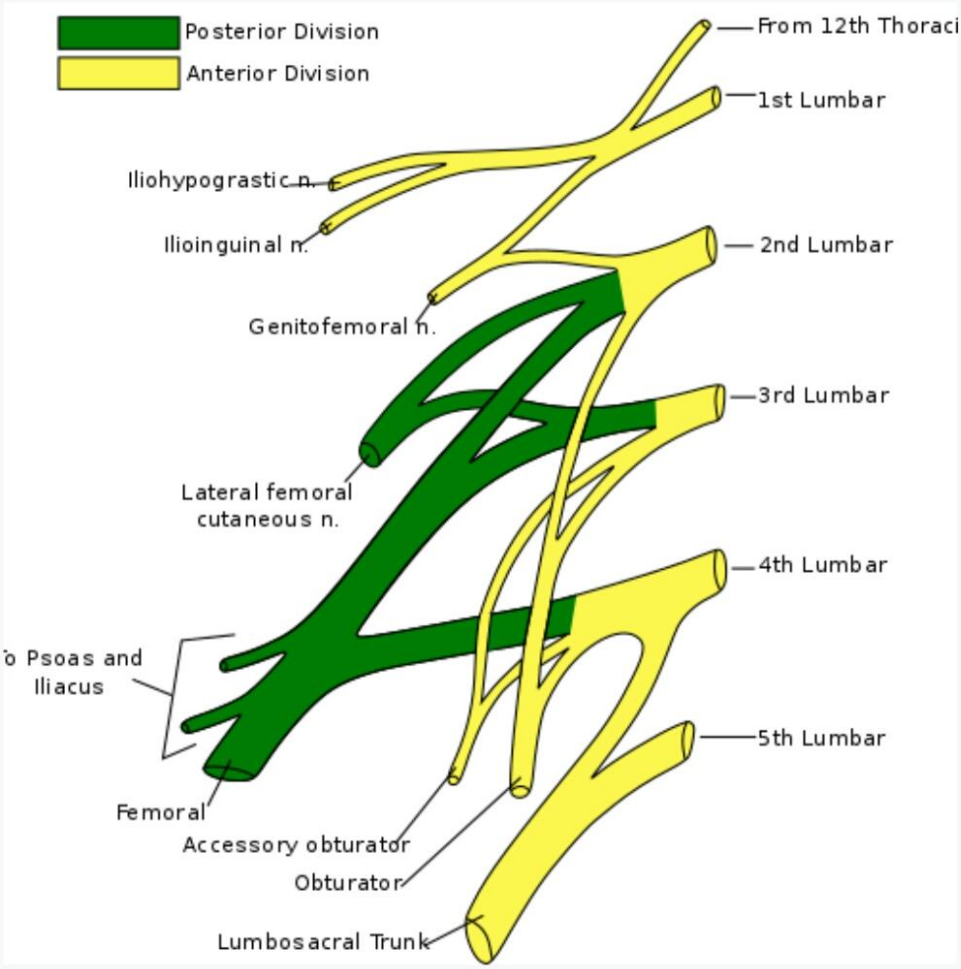
Chronic groin pain is one of the most in debilitating long-term complications after inguinal hernia repair, which can significantly a affect the patient's satisfaction and quality of life after the operation. A proposed

mechanism for the development of post-operative pain chronic groin pain is the inflammation and fibrosis induced by the mesh, which is in close proximity to the ilioinguinal nerve. In addition, unintentional injury or strangulation of the ilioinguinal nerve during suturing may also contribute to the phenomenon.

Lumbar Plexus



Ilioinguinal nerve



Ilioinguinal Nerve Involvement:

Damage to ilio-inguinal nerve passing to through the surgical field is suspected to be one of the main causes of chronic postherniorrhaphy pain. This theory is supported by the association between chronic pain and sensory di disturbances (30) A nerve may be damaged during operation as a result of perineural fibrosis, entrapment by staples, sutures, or prosthetic materials, an and direct lesions due to stretching, contusion, electrical injury, and partial or complete division of the nerve.(31)

Elective division om of the ilioinguinal nerve was proposed by hernia surgeons to reduce the risk of its inadvertent damage and consequent chronic pain.(32)

The first randomized trial to address this problem by Ravichandran et al., (33) underpowered and no in definite conclusion could be made. The authors found no evidence to support the benefit of ilioinguinal nerve ddivision with respect to postoperative pain within the limitation of a small sample size.

Results from subsequent trials regarding chronic groin pain following elective neurectomy have been inconsistent. Wantz (32) showed that chronic pain was not present in 546 patients who underwent hernia repair with elective division of the ilioinguinal nerve, whereas it was seen in patients with the nerve preserved.

No relation between ilioinguinal nerve preservation or elective division and chronic pain was reported in a large study by Cunningham et al. (29)

According to another study of 172 in patients division of cutaneous nerves during inguinal hernia repair has no significant effect on postoperative pain. However, there are very few adverse outcomes, and so, a apragmatic approach of dividing nerves when they would otherwise be damaged may be appropriate.

The prophylactic a excision of ilioinguinal nerve during Lichtenstein inguinal hernia repair decreases the incidence of exertional chronic groin pain after surgery according to the study by Wilfred Lik-Man Mui et al.(34)

MATERIALS

AND METHODS

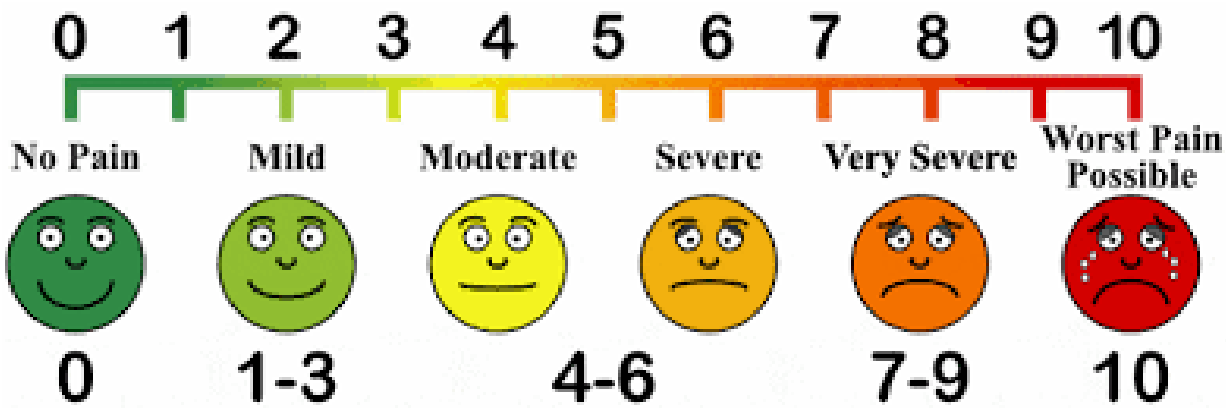
MATERIALS AND METHODS

From February to September 2017, 50 patients who were older than 18 years with primary unilateral uncomplicated inguinal hernia, who presented for operation in the department of General surgery, Govt. Royapettah Hospital, Kilpauk Medical college, were considered eligible for the study. After a approval by local bioethics committees, informed consent was obtained of preoperatively on hospital admission. Before operation patients were randomly allocated to undergo hernia mesh repair either with ilioinguinal nerve preservation (group A) or transection (group B). Operations were all performed with the patients under spinal anesthesia. All patients received the standard flat mesh repair according to the technique described by Lichtenstein et al. In group A, the whole ilioinguinal nerve was excised as far lateral to the deep ring as possible and medially to where it entered the rectus muscles. The cut ends were left alone of without implantation into muscle or ligation. Histologic examination of the nerve was performed to confirm complete excision. Any small cutaneous nerves that interfere with mesh placement were excised as well.

In group B, the ilioinguinal nerve was carefully protected throughout the operation. The rest of the procedure was performed in a standardized manner. A monofilament polypropylene mesh was anchored with polypropylene sutures (PROLENE, Ethico Johnson & Johnson Unit) to the reflected part of inguinal ligament and the floor of the inguinal canal. An Extreme care was used during

surgery to avoid inclusion of nerve tissue during suturing and mesh placement. The patients were all managed in a standard clinical pathway postoperatively and were followed up at 1 and 6 months after operation.

VAS Scale For Pain



INCLUSION CRITERIA :

1. All male patients between the age of 18 and 70 years
2. All patients with unilateral inguinal hernias either direct inguinal hernia or indirect inguinal hernias.
3. All patients who is fit to undergo elective surgery with good perfomance status.
4. All patients with uncomplicated unilateral hernias.
5. All patients were planned for elective hernia repair.

After explaining the procedure and proposed outcomes to the patients were divided in to two groups group a- undergoing ilioinguinal neurectomy with lichenstein's mesh repair and the second group b-preserving the ilioinguinal nerve in lichenstein's mesh repair.

EXCLUSION CRITERIA:

1. Male patients with bilateral inguinal hernias
2. All patients below the age of 18 years
3. Female patients with inguinal hernias.
4. All male patients with complicated inguinal hernias like obstructed or strangulated inguinal hernias requiring emergency management.
5. Those with recurrent hernias.
6. Those with h/o peripheral neuropathy.
7. Those with impaired cognitive function.
8. Patients with poor performance status.

The primary outcome was the incidence of groin pain at the end of six months. Secondary outcomes included incidence of groin numbness, postoperative sensory loss or change at the groin region.

All follow up and measurements were carried out at the end of one and six months following surgery.

Pain assessment:

Postoperative pain was assessed using a 4-point in verbal scale (none, mild, moderate, or severe), assigning numerical values of 0 to 3 one week after operation. Mild pain was defined as an occasional in disturbance that did not limit normal activities, moderate pain as pain that interfered with normal day life activities, and of severe pain as pain that rendered the patient unable to perform normal activities. At 1-month and 6-month follow-up visits, pain experienced during the last week before all the visit was assessed using the same scale. Follow-up questionnaires were performed at the end of the study with the aim of assessing the presence and intensity of pain related to the operation, using the same 4-point verbal scale.

In addition, during follow-up visits, patients were also tested for the presence of numbness and sensory loss to light touch and pain sensation in the area of distribution of the ilioinguinal nerve.

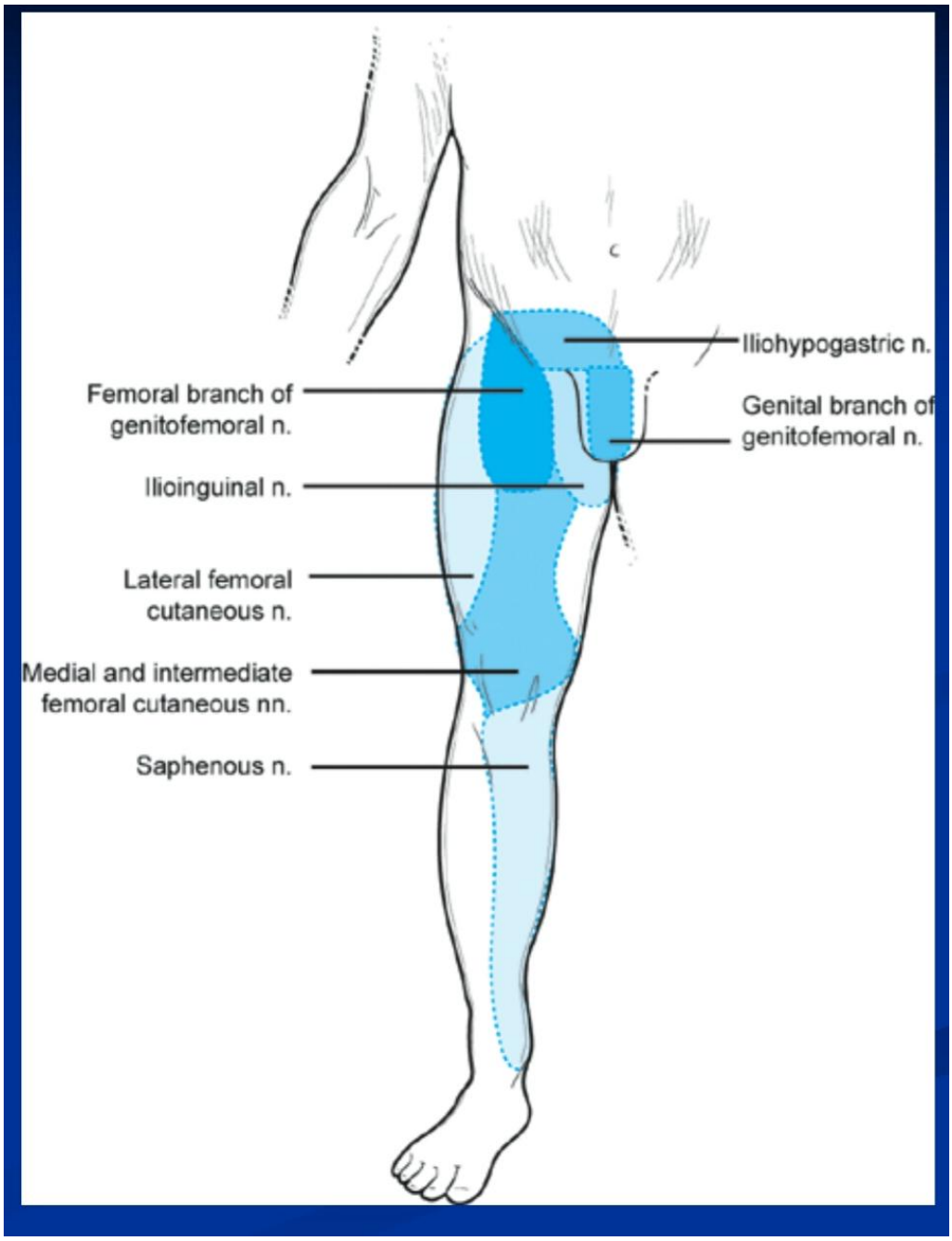
During each follow up visit, pain at rest and upon completion of various activities (coughing for 10 times, walking up 3 flights of stairs, and cycling for 10 minutes) were assessed by a 4-point scale (none, mild, moderate, or severe). Patients were also requested to fill in a questionnaire regarding pain or discomfort encountered during normal daily activities at home.

Sensory Assessment:

In addition, the groin a region was divided into 5 cutaneous areas, namely, outer upper, outer lower, inner upper, inner lower, and scrotal region in

relation to the groin incision for sensory assessment. Sensation loss or changes were assessed by the standard Semmes-Weinstein monofilament test performed by the occupational therapist to the 5 regions of each side by the technique a described by Bell. The no operative side of each individual acted as the control. Sensation loss or changes were defined as any asymmetry between corresponding regions of the 2 sides demonstrated by the monofilament test.

Chronic groin a pain was defined as any discomfort or pain elicited on follow-up or encountered during normal daily activities. Severe pain was defined as pain experienced in any aspects graded moderate or severe at follow-up.


Iliohypogastric n.
Femoral branch of genitofemoral n.
Genital branch of genitofemoral n.
Ilioinguinal n.
Lateral femoral cutaneous n.
Medial and intermediate femoral cutaneous nn.
Saphenous n.

Statistical Analysis.

The calculated samples size was based on the assumption that a minimum difference in incidence of chronic groin pain of 20% would be meaningful and to achieve 80% power with 2-sided *P* value <0.05 as significant, 25 patients per group were required.

Statistical analysis was based on intention-to-treat analysis and was performed with statistical software Statistical Package for Social Science (a version 11.0 for Windows, SPSS, Inc., Chicago IL).

Comparisons were carried out in by the Pearson $\chi 2$ test or Fisher exact test where appropriate for categorical data and Student *t* test for parametric data. A 2-sided *P* value of less than 0.05 was considered significant.

RESULTS

RESULTS

A total of 50 patients were eligible for the study during the 6 month period and randomized with 25 patients in each group. The flow of participants was shown. Figure 1, respectively. The 2 groups were comparable with regard to educational level, laterality of hernia, baseline pain measurement during various activities, incidence of groin numbness, and complications. The baseline characteristics of 2 groups of patients are shown in Table 1.

BASELINE CHARACTERISTICS

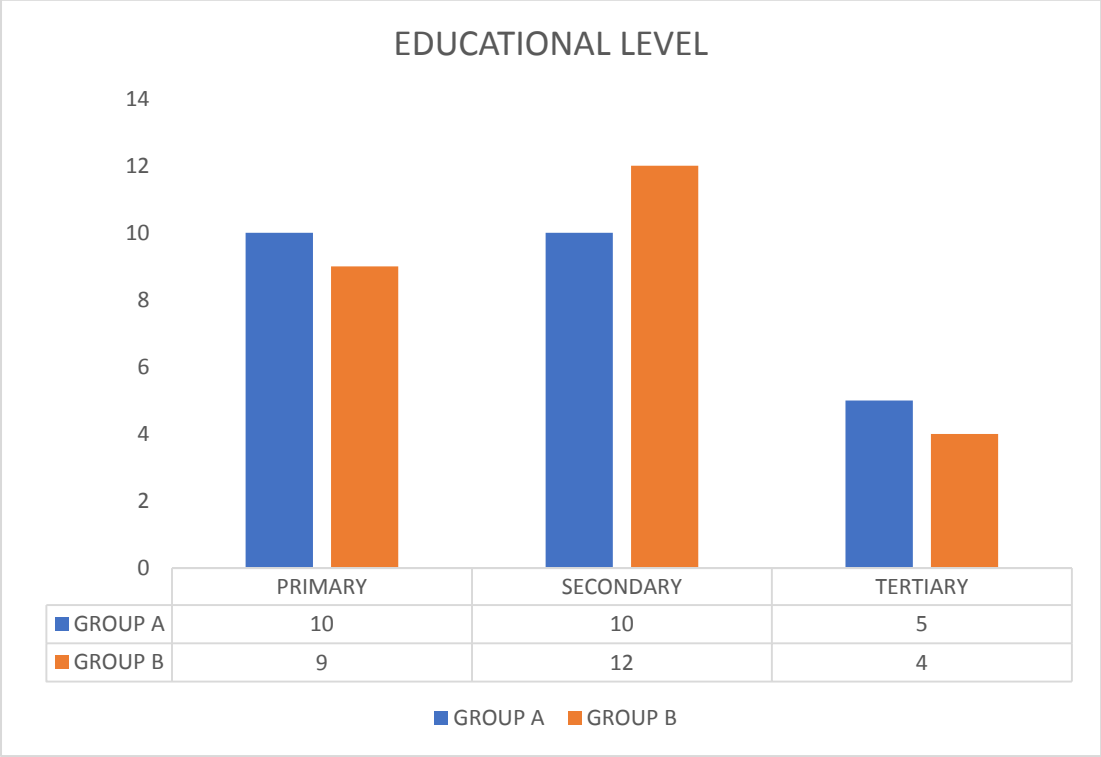
ELECTIVE NEURECTOMY GROUP A (n=25)

NERVE PRESERVATION GROUP B (n=25)

EDUCATION LEVEL [(no (%)]

0.71

EDUCATION	GROUP A	GROUP B
PRIMARY	10(40)	9(36)
SECONDARY	10(40)	12(48)
TERTIARY	5(20)	4(16)



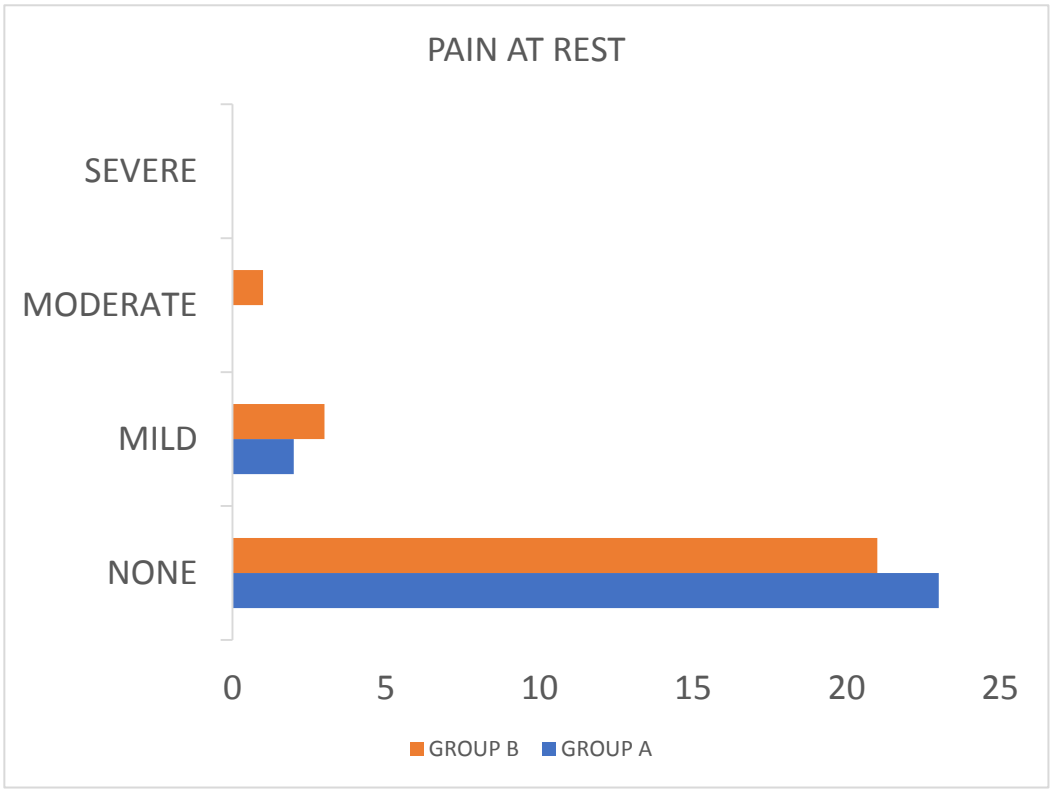
PAIN AT REST [no(%)]

0.541

1. ANY DEGREE (3+4+5) GROUP A 2 (8 %)

GROUP B 4(16%)

PAIN	GROUP A	GROUP B
2.NONE	23 (90)	21 (86)
3.MILD	2 (10)	3 (12)
4.MODERATE	0 (0)	1 (2)
5.SEVERE	0 (0)	0 (0)



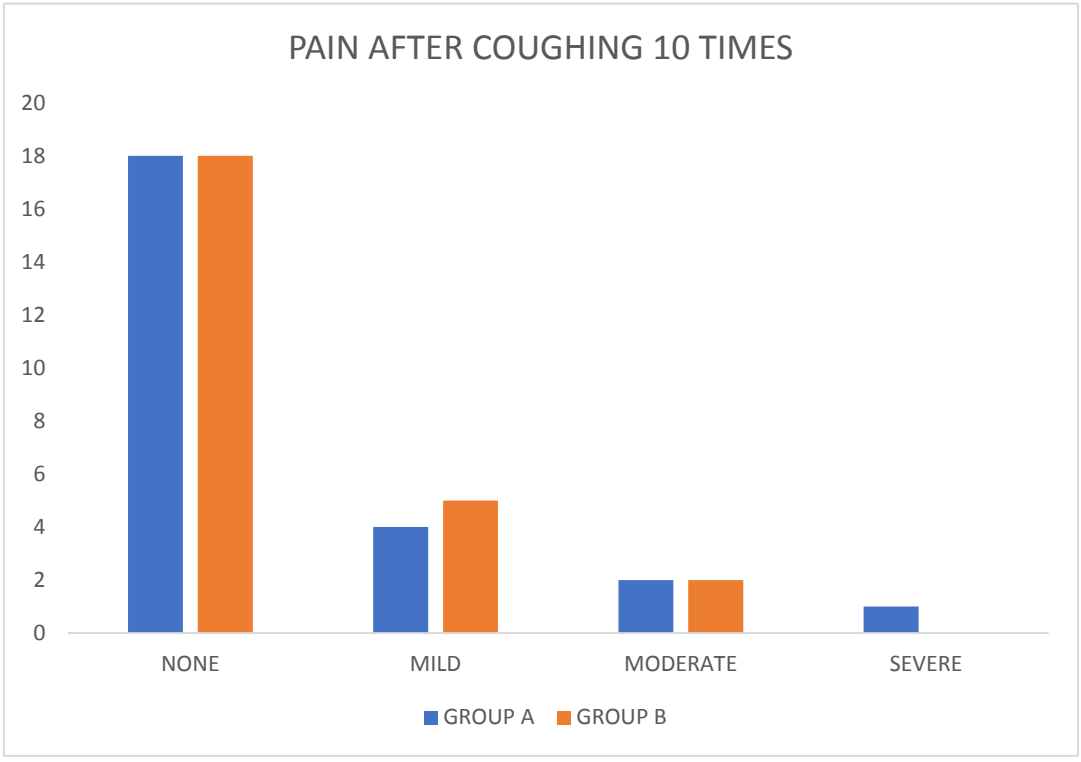
PAIN AFTER COUGHING 10TIMES [(no%)]

1. ANY DEGREE (3+4+5) 0.66

GROUP A 7 (28%)

GROUP B 7 (28%)

PAIN	GROUP A	GROUP B
2.NONE	18 (72)	18 (72)
3.MILD	4(16)	5(20)
4.MODERATE	2(8)	2(8)
5.SEVERE	1(4)	0(0)



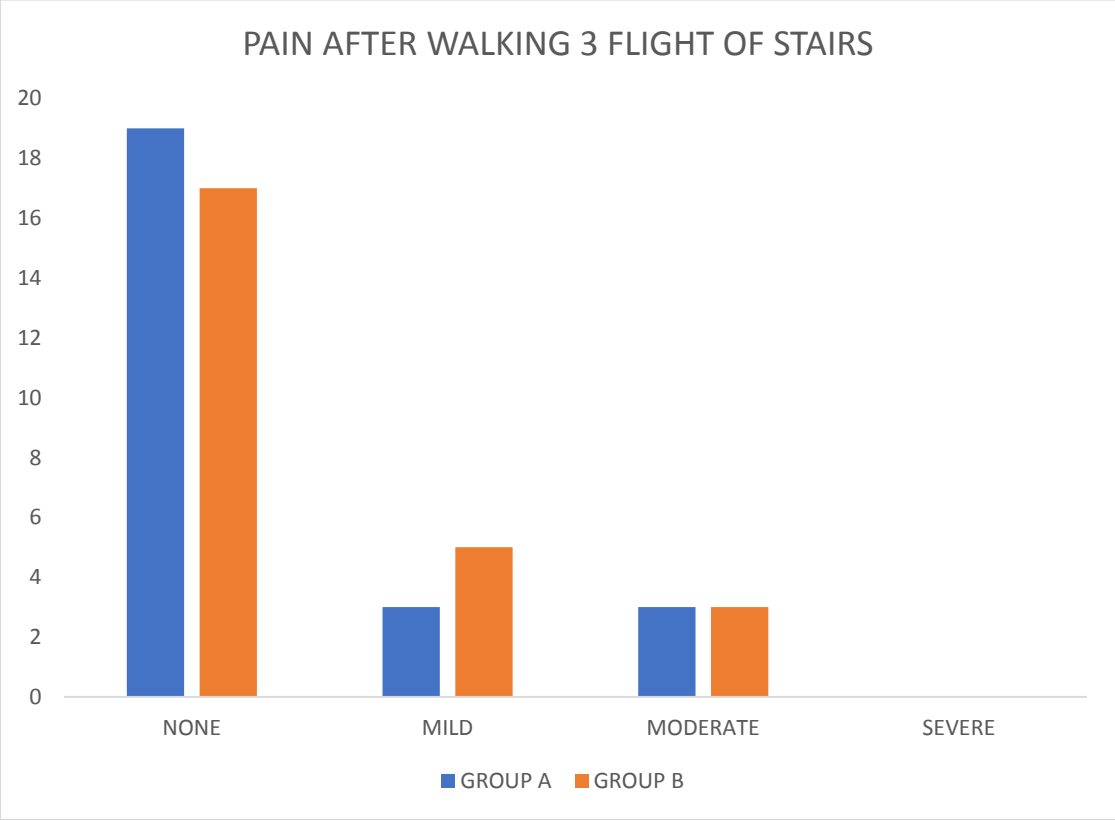
PAIN AFTER WALKING 3 FLIGHT OF STAIRS [NO(%)]

1. ANY DEGREE (3+4+5) 0.51

GROUP A 6 (24%)

GROUP B 8(32%)

PAIN	GROUP A	GROUP B
2.NONE	19(76)	17(68)
3.MILD	3(12)	5(20)
4.MODERATE	3(12)	3(12)
5.SEVERE	0(0)	0(0)



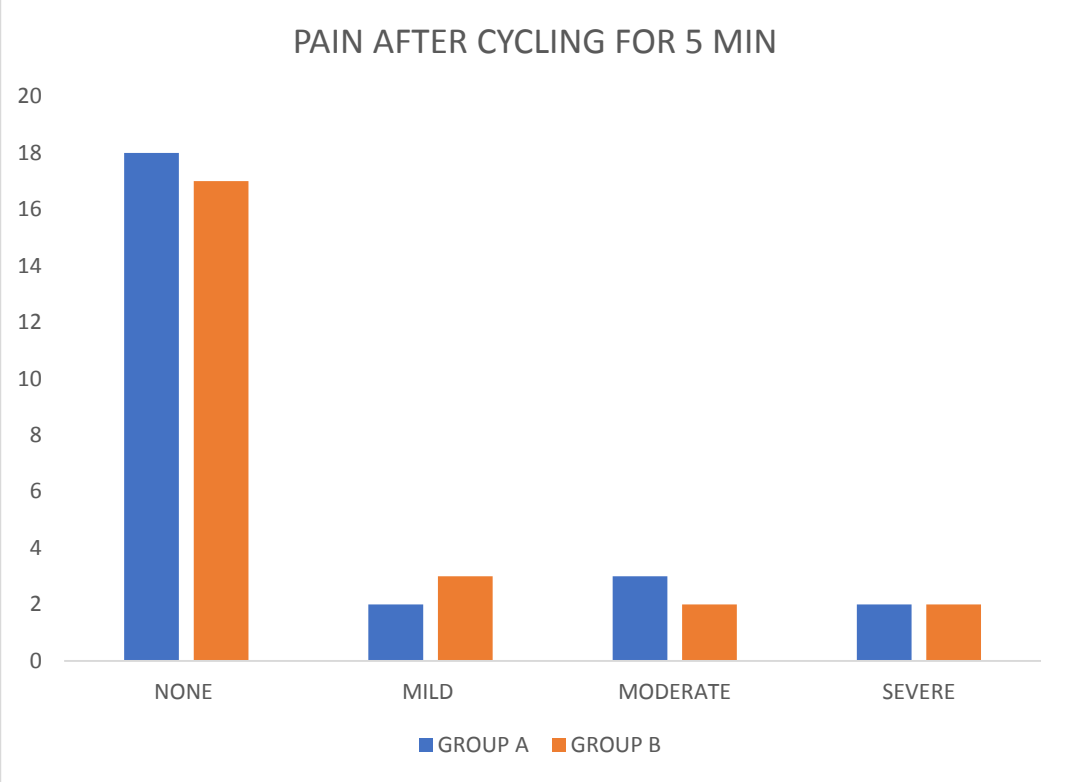
PAIN AFTER CYCLING FOR 5MIN [NO(%)]

1. ANY DEGREE (3+4+5) 0.83

GROUP A 7(28%)

GROUP B 8(32%)

PAIN	GROUP A	GROUP B
2.NONE	18(72)	17(68)
3.MILD	2(8)	3(12)
4.MODERATE	3(12)	2(8)
5.SEVERE	2(8)	2(8)



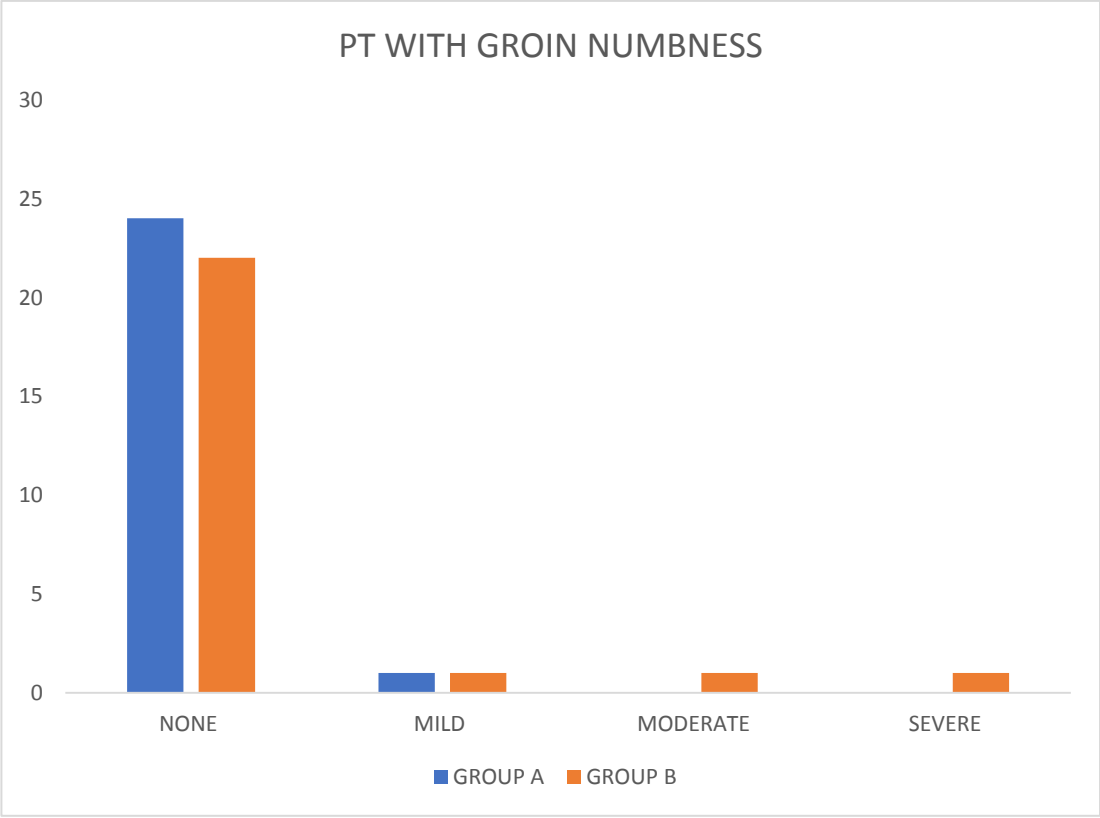
PERCENTAGE WITH GROIN NUMBNESS [NO(%)]

1. ANY DEGREE (3+4+5) 0.44

GROUP A 1 (4%)

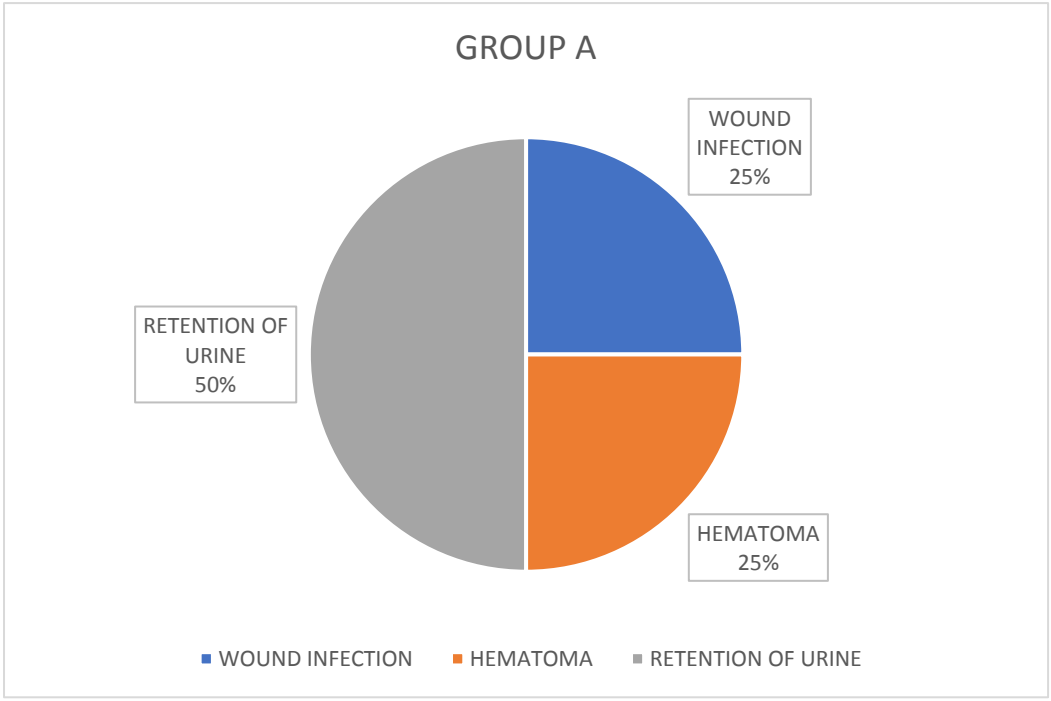
GROUP B 3(12%)

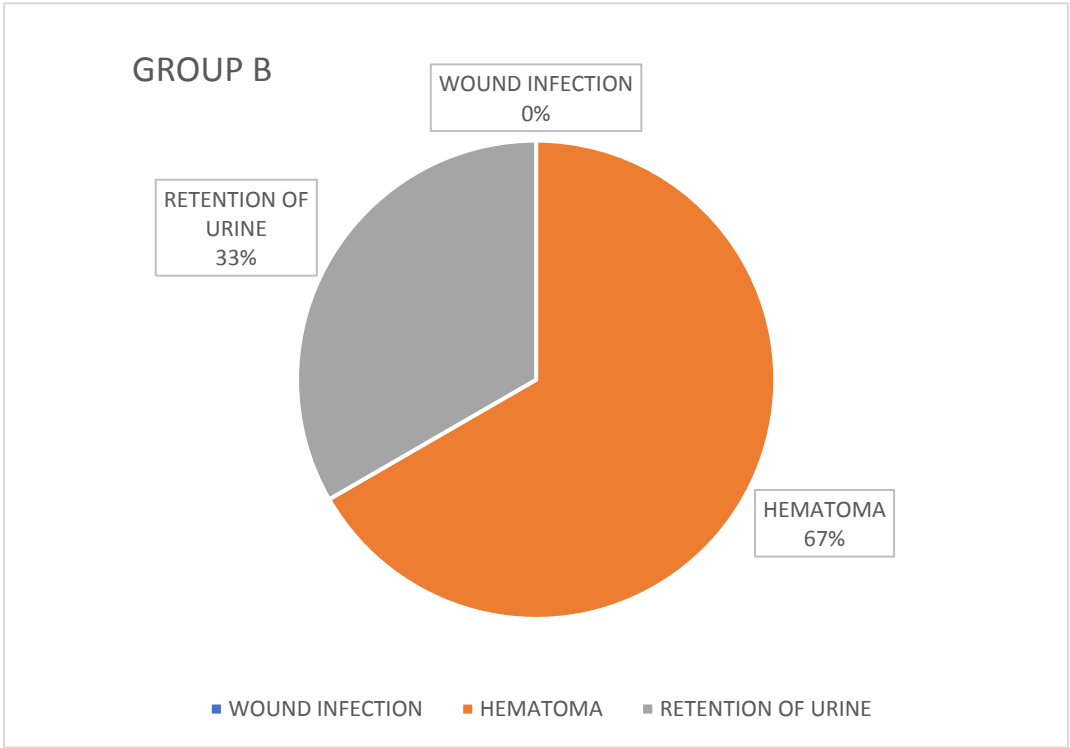
PAIN	GROUP A	GROUP B
2.NONE	24(96)	22(88)
3.MILD	1(4)	1(4)
4.MODERATE	0(0)	1(4)
5.SEVERE	0(0)	1(4)



COMPLICATIONS [NO (%)]

COMPLICATIONS	GROUP A	GROUP B	MEAN (SD)
WOUND INFECTION	1(4)	0(0)	1.0
HEMATOMA	1(4)	2(8)	1.0
RETENTION OF URINE	2(8)	1(4)	1.0


GROUP A
WOUND INFECTION 25%
HEMATOMA 25%
RETENTION OF URINE 50%
WOUND INFECTION
HEMATOMA
RETENTION OF URINE


GROUP B
WOUND INFECTION 0%
RETENTION OF URINE 33%
HEMATOMA 67%
WOUND INFECTION
HEMATOMA
RETENTION OF URINE

Results at the End of 1 Month Follow Up:

The ilioinguinal nerve a was identified in all patients, and complete excision of nerve was confirmed by histology in all patients from group A. Twenty five in both groups were available for assessment at 1 month. The incidence of chronic groin pain, pain experienced urging normal daily activities at home and of after various activities (at rest, coughing for 10times, walking up 3 flights of stairs, and cycling for 10 minutes), were similar between the 2 groups. There were no significant differences in the incidence of groin numbness and sensation changes or loss at groin region between the 2 groups. The results at 1month of follow up are

NO. OF PATIENTS DEVELOPED CHRONIC PAIN AFTER 1 MONTH

GROUP A 18(72)

GROUP B 18(72)

MEAN (SD) 1.0

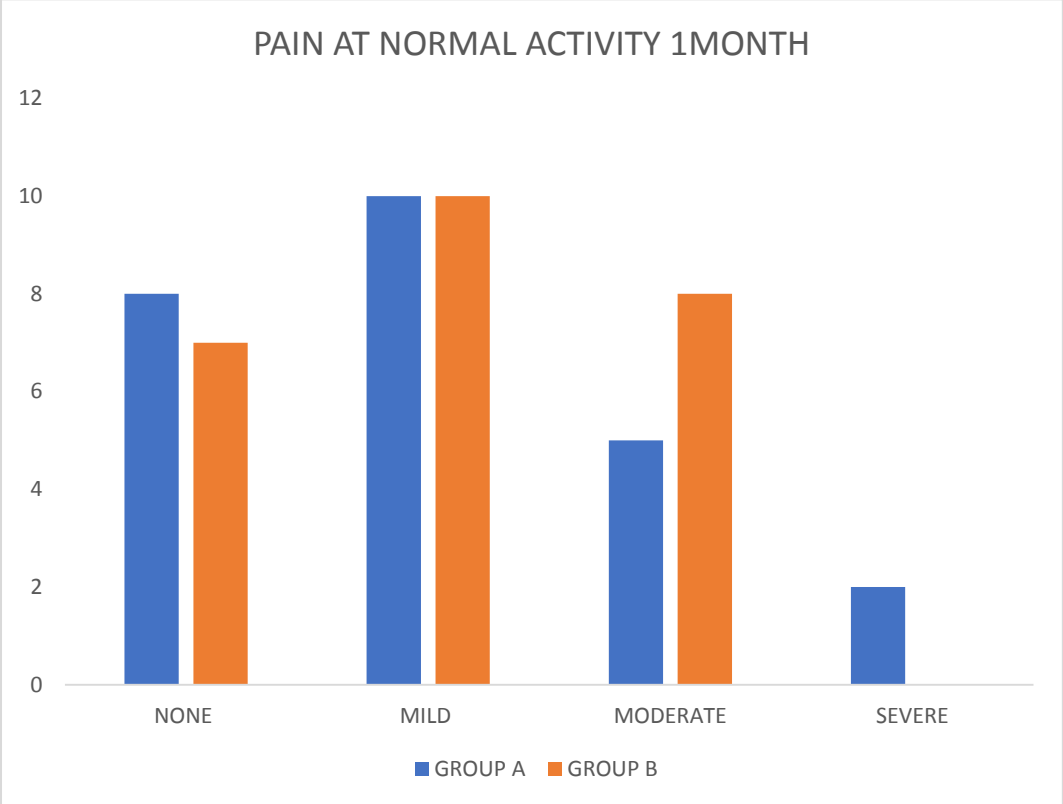
PAIN AT NORMAL ACTIVITY [NO (%)]

1. ANY DEGREE (3+4+5) 0.37

GROUP A 17 (68%)

GROUP B 18 (72)

PAIN	GROUP A	GROUP B
2.NONE	8(32)	7(28)
3.MILD	10(40)	10(40)
4.MODERATE	5(20)	8(32)
5.SEVERE	2(8)	0(0)



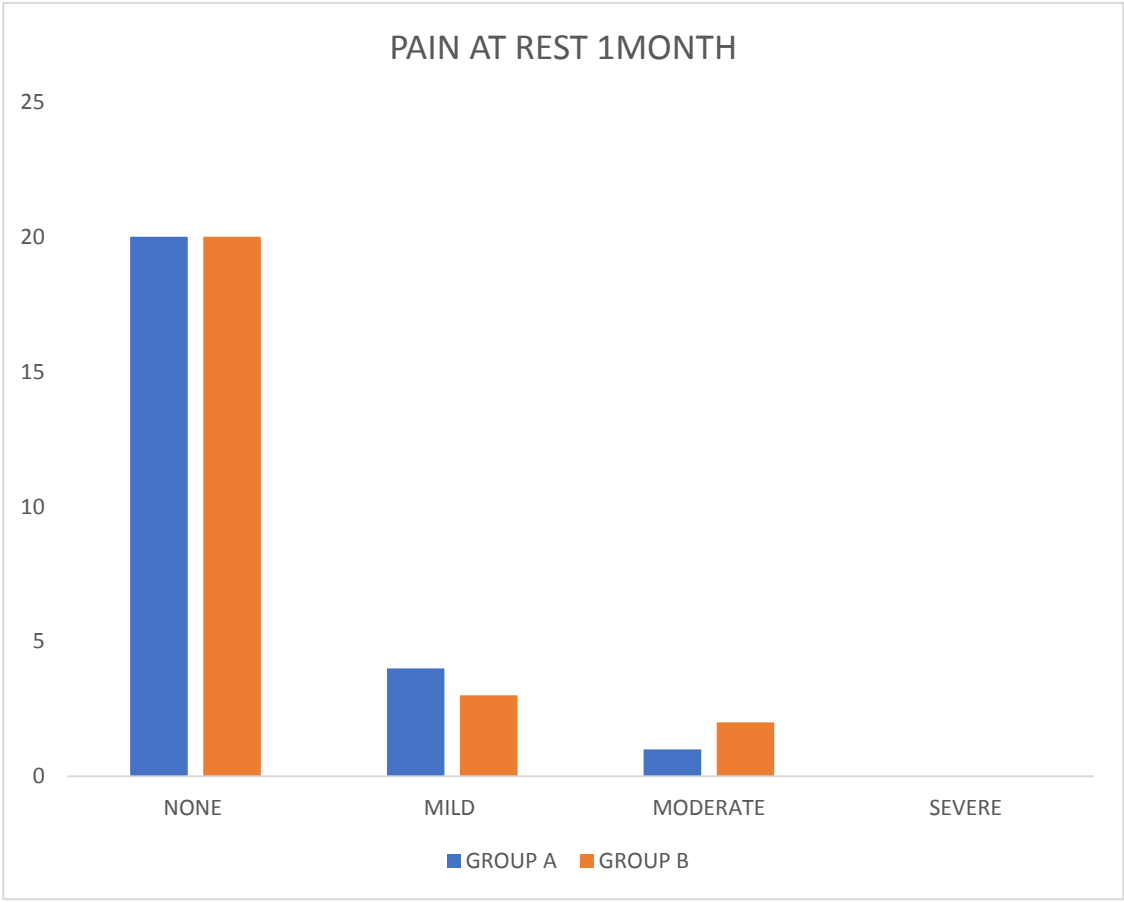
PAIN AT REST [NO(%)]

1. ANY DEGREE (3+4+5) 1.0

GROUP A 8 (32%)

GROUP B 8 (32%)

PAIN	GROUP A	GROUP B
2.NONE	20(80)	20(80)
3.MILD	4(16)	3(12)
4.MODERATE	1(4)	2(8)
5.SEVERE	0(0)	0(0)



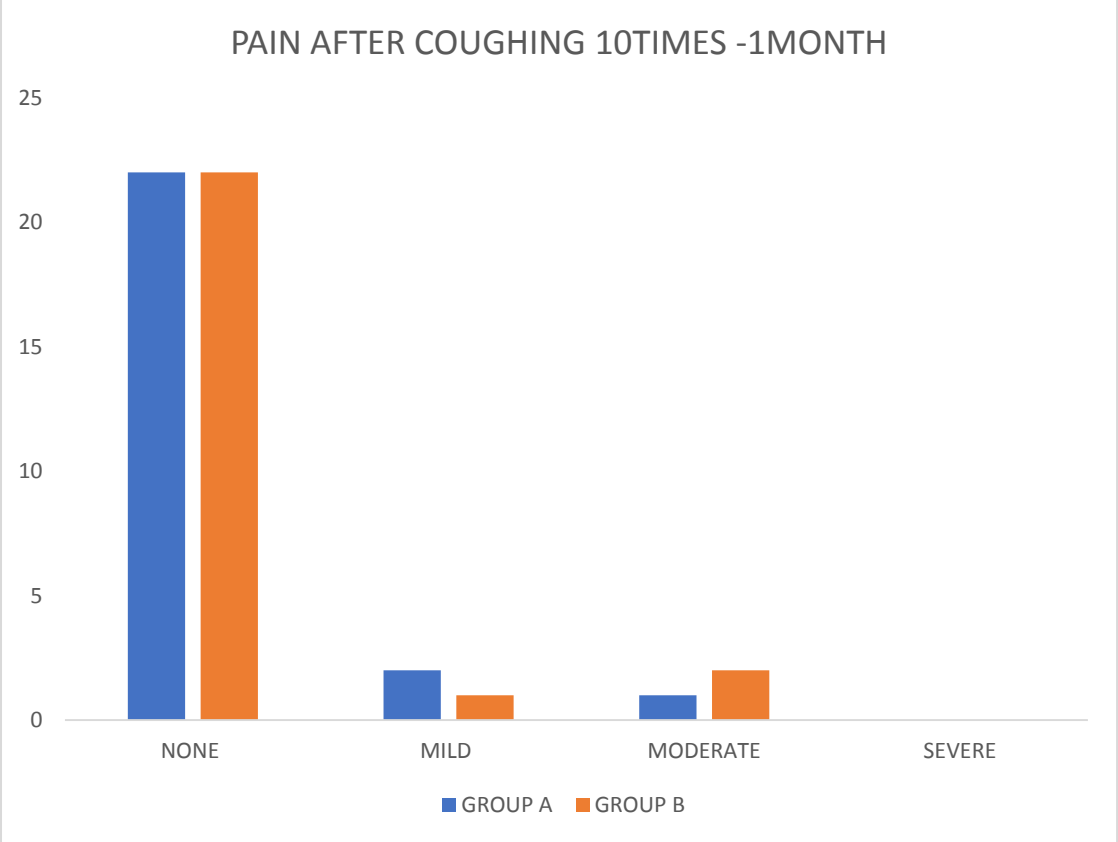
PAIN AFTER COUGHING 1OMIN [NO (%)]

1. ANY DEGREE (3+4+5) 1.0

GROUP A 3(12%)

GROUP B 3(12%)

PAIN	GROUP A	GROUP B
2.NONE	22(88)	22(88)
3.MILD	2(8)	1(4)
4.MODERATE	1(4)	2(8)
5.SEVERE	0(0)	0(0)



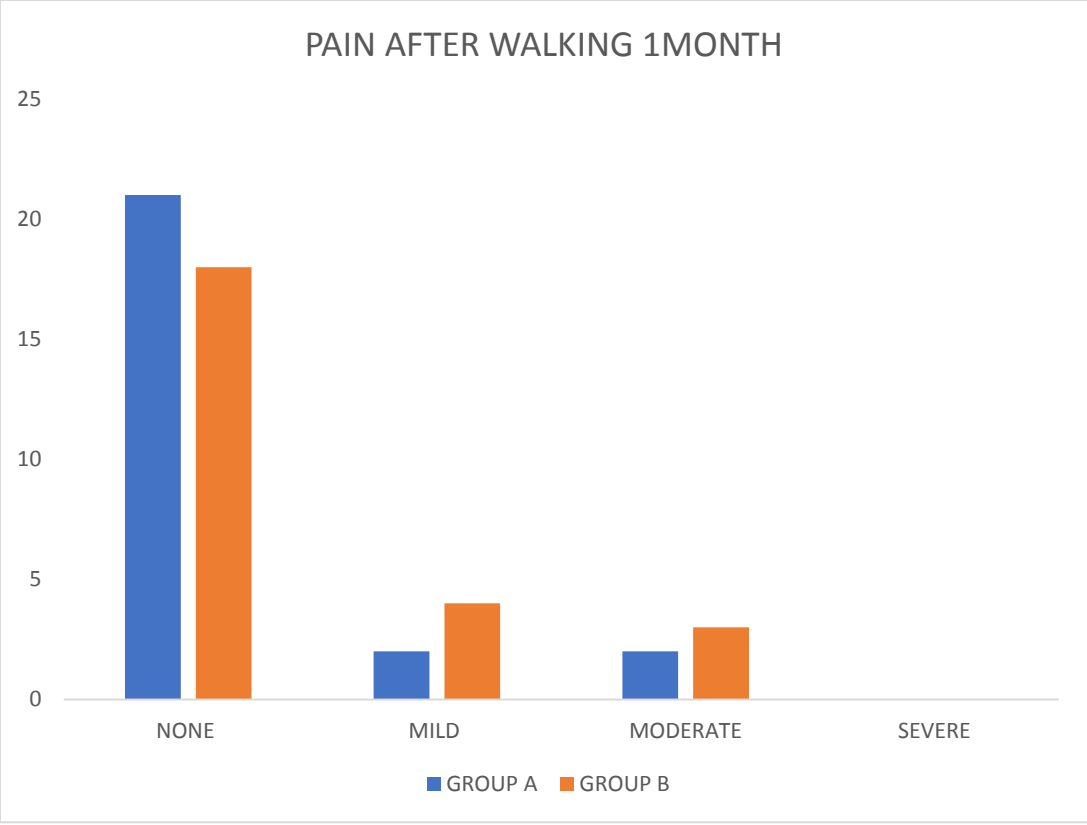
PAIN AFTER WALKING 3 FLIGHT OF STAIRS [N (%)]

1. ANY DEGREE (3+4+5) 0.1

GROUP A 4 (16%)

GROUP B 7 (28%)

PAIN	GROUP A	GROUP B
2.NONE	21(84)	18(72)
3.MILD	2(8)	4(16)
4.MODERATE	2(8)	3(12)
5.SEVERE	0(0)	0(0)

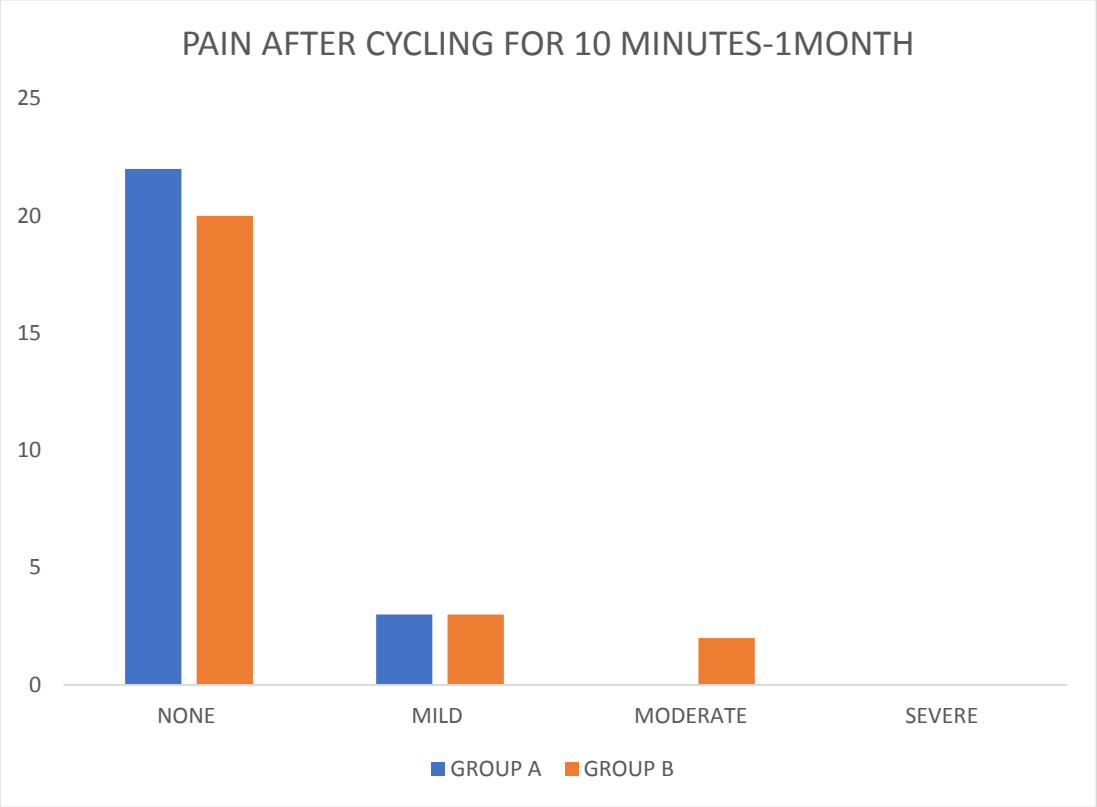


1. ANY DEGREE (3+4+5) 0.10

GROUP A 3 (12%)

GROUP B 5(20%)

PAIN	GROUP A	GROUP B
2.NONE	22(88)	20(80)
3.MILD	3(12)	3(12)
4.MODERATE	0(0)	2(8)
5.SEVERE	0(0)	0(0)



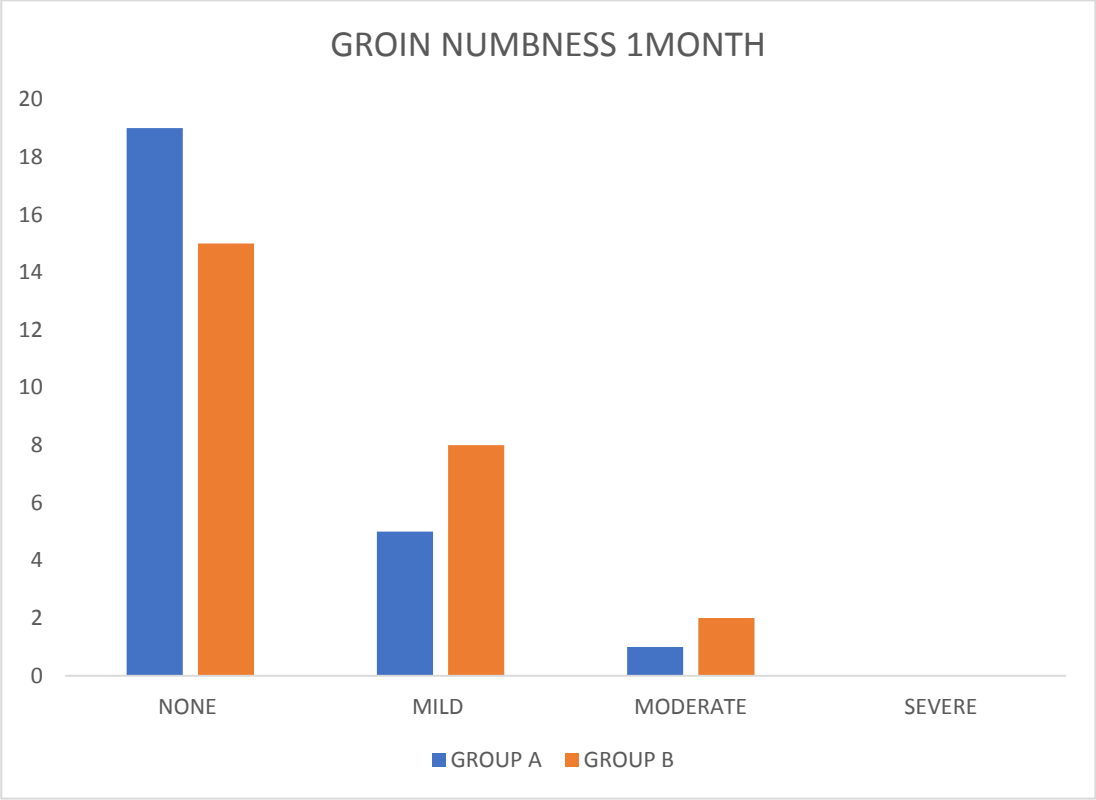
GROIN NUMBNESS [NO (%)]

1. ANY DEGREE (3+4+5) 1.0

GROUP A 6 (24%)

GROUP B 10 (40%)

PAIN	GROUP A	GROUP B
2.NONE	19(76)	15(60)
3.MILD	5(20)	8(32)
4.MODERATE	1(4)	2(8)
5.SEVERE	0(0)	0(0)



NO (%) OF Patients developed sensation changes or loss

GROUP A 13(52%)

GROUP B 15(60%)

MEAN (SD) 0.29

RESULT AT ONE MONTH FOLLOW UP

PAIN EXPERIENCED DURING NORMAL DAILY ACTIVITIES [NO(%)]

P=0.37

PAIN EXPERIENCED AT REST [NO(%)]

P=1.0

PAIN EXPERIENCED AFTER COUGHING 10 TIMES [NO (%)]

P=1.0

PAIN EXPERIENCED AFTER WALKING 3 FLIGHT OF STAIRS [NO (%)]

P=0.10

PAIN EXPERIENCED AFTER CYCLING FOR 10 MINUTES [NO (%)]

P=0.10

PATIENT WITH GROWING NUMBNESS

P=1.0

Results at the End of 6 Month Follow Up:

Twenty five patients in group A and twenty five patients in group B (98%) were available for assessment at the 6-month end follow-up. The incidence of chronic groin pain at 6 months was significantly lower in group A compared with group B (2[8%] vs. 7[28%]; P = 0.008, Fisher exact test). The incidence of the pain experienced after walking 3 flights of stairs and cycling for 10 minutes were significantly lower in group A than group B (1[4%] vs. 3[12%]; P = 0.03; 1[4%] vs. 5 [20%]; P = 0.015, Fisher exact test, respectively). The severity of chronic pain developed was comparable between the 2 groups. There were no significant differences in the incidence of pain experienced during normal daily activities at home and after coughing for 10 times at 6 months. The incidences of groin numbness and sensation changes or loss of sensation at groin region were also similar between the 2 groups at 6 months. The results are summarized

NO (%) OF patients developed chronic pain at 6months

0.008

GROUP A 2(8%)

GROUP B 7(28%)

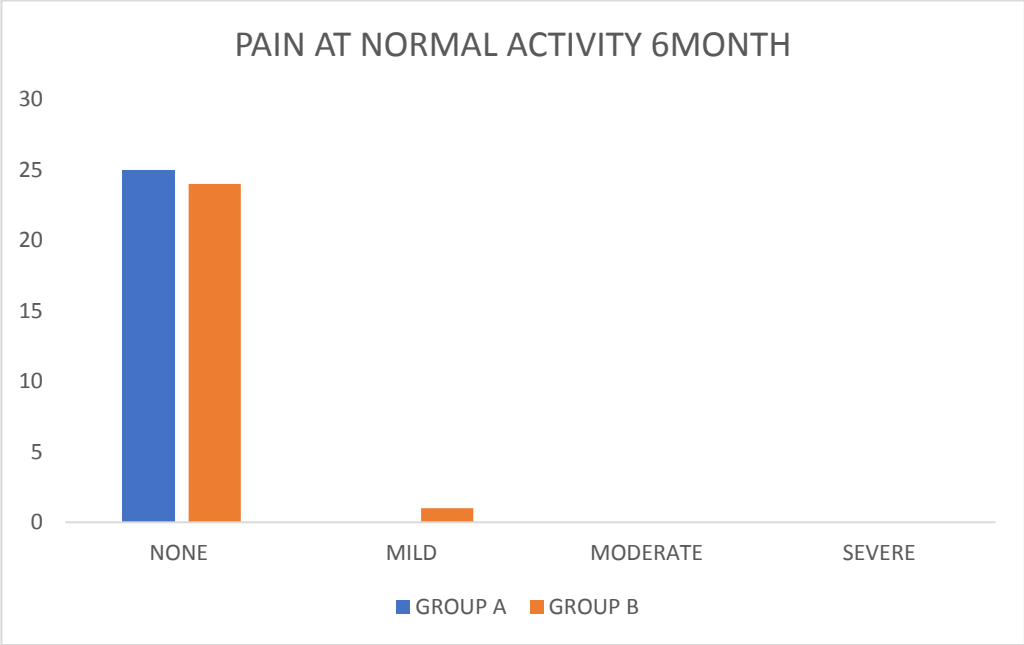
PAIN AT NORMAL ACTIVITY [NO(%)]

1. ANY DEGREE (3+4+5) 1.0

GROUP A 0(0%)

GROUP B 2 (2)

PAIN	GROUP A	GROUP B
2.NONE	25(100)	24(96)
3.MILD	0(0)	1(4)
4.MODERATE	0(0)	0(0)
5.SEVERE	0(0)	0(0)



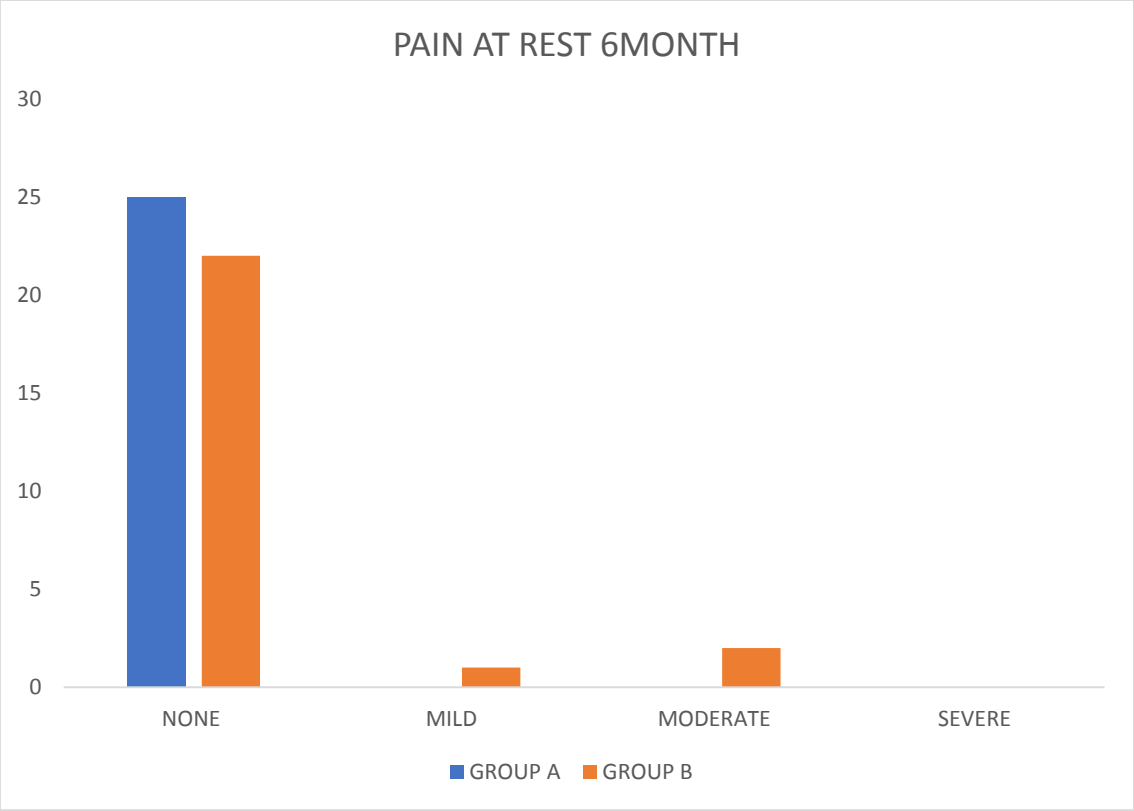
PAIN AT REST [NO (%)]

1. ANY DEGREE (3+4+5) 0.56

GROUP A 0 (0%)

GROUP B 3(12%)

PAIN	GROUP A	GROUP B
2.NONE	25(100)	22(88)
3.MILD	0(0)	1(4)
4.MODERATE	0(0)	2(8)
5.SEVERE	0(0)	0(0)



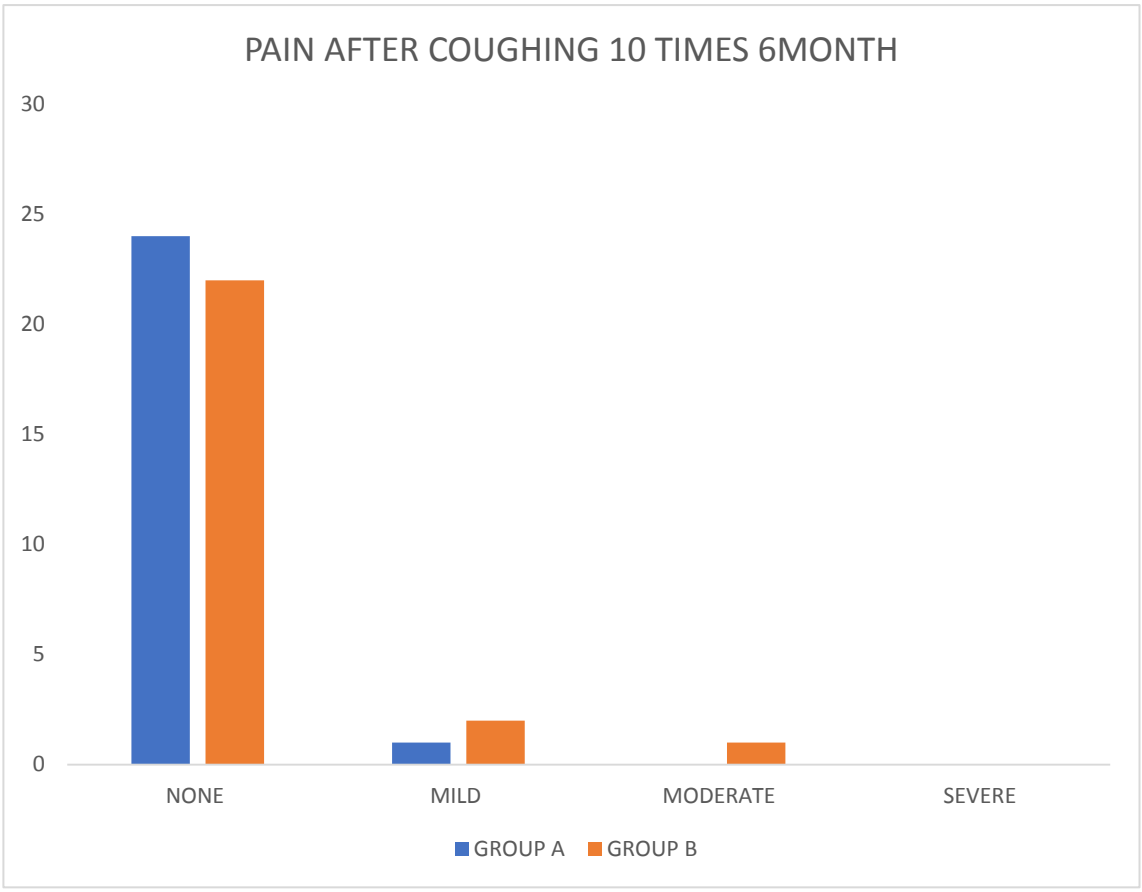
PAIN AFTER COUGHING 10 TIMES [NO (%)]

1. ANY DEGREE (3+4+5) 0.27

GROUP A 1 (4%)

GROUP B 3 (12%)

PAIN	GROUP A	GROUP B
2.NONE	24(96)	22(88)
3.MILD	1(4)	2(8)
4.MODERATE	0(0)	1(4)
5.SEVERE	0(0)	0(0)



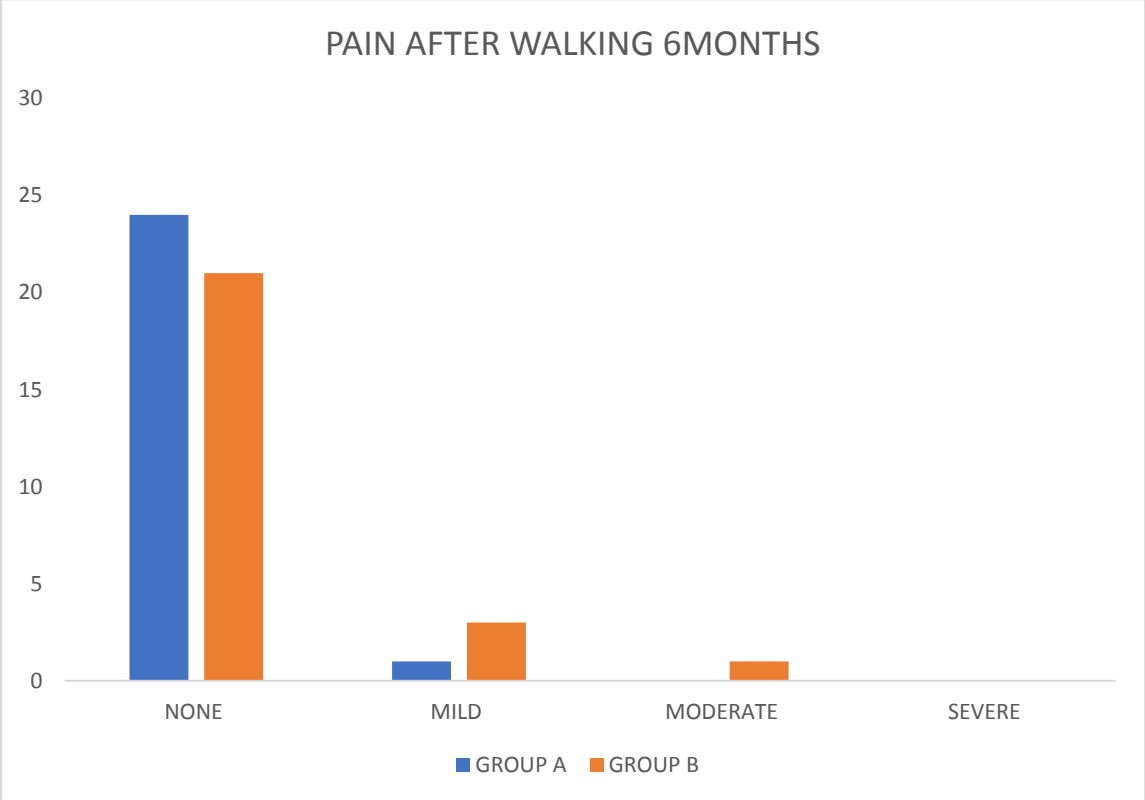
PAIN AFTER WALKING [NO (%)]

1. ANY DEGREE (3+4+5) 0.03

GROUP A 1 (4%)

GROUP B 3(12%)

PAIN	GROUP A	GROUP B
2.NONE	24(96)	21(84)
3.MILD	1(4)	3(12)
4.MODERATE	0(0)	1(4)
5.SEVERE	0(0)	0(0)



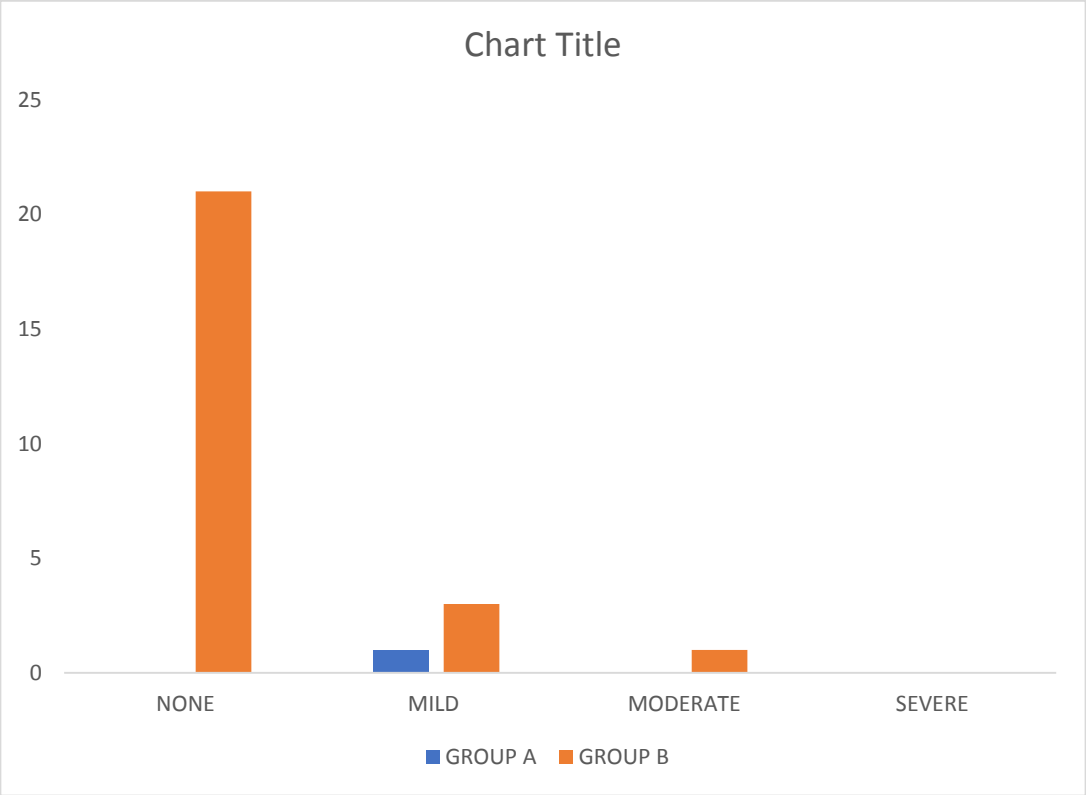
PAIN AFTER CYCLING

1. ANY DEGREE (3+4+5) .023

GROUP A 0 (0)

GROUP B 0(0)

PAIN	GROUP A	GROUP B
2.NONE	0(0)	21(84)
3.MILD	1(4)	3(12)
4.MODERATE	0(0)	1(4)
5.SEVERE	0(0)	0(0)



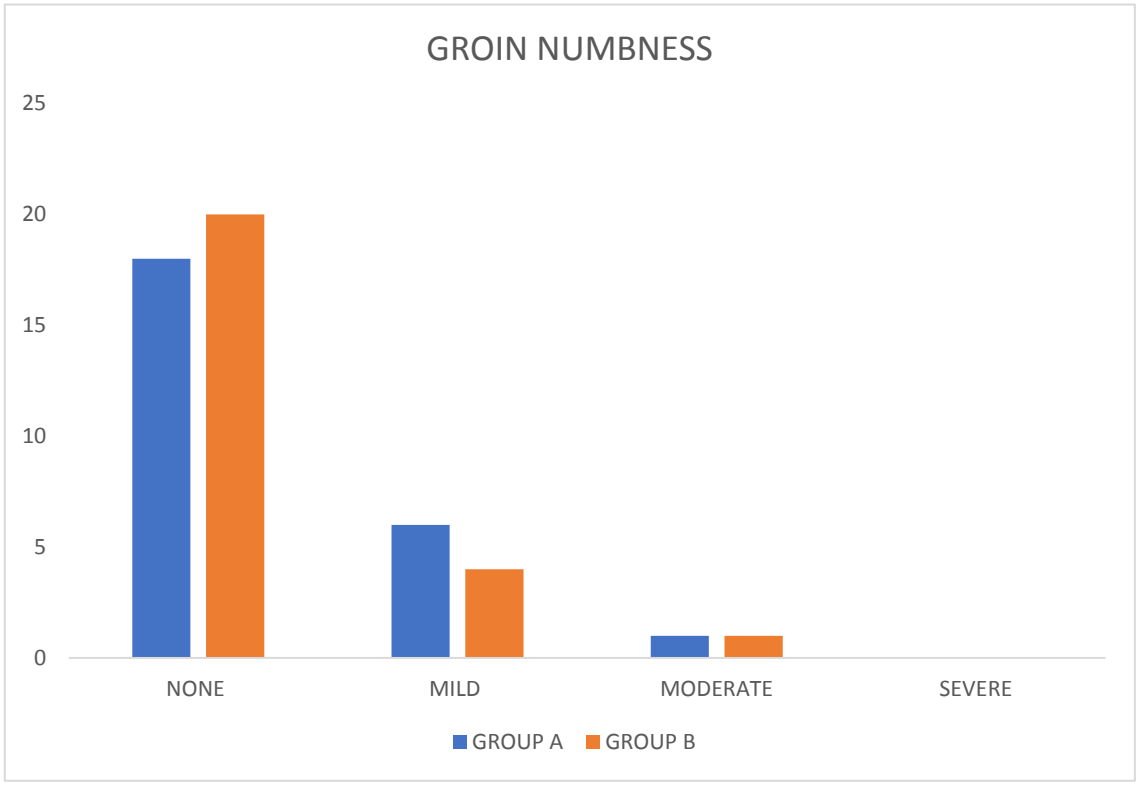
GROIN NUMBNESS [NO(%)]

1.ANY DEGREE (3+4+5) .361

GROUP A 7 (28%)

GROUP B 5 (20%)

PAIN	GROUP A	GROUP B
2.NONE	18(72)	20(80)
3.MILD	6(24)	4(16)
4.MODERATE	1(4)	1(4)
5.SEVERE	0(0)	0(0)



RESULTS AT THE END OF 6MONTHS FOLLOW UP

PAIN EXPERIENCED DURING NORMAL DAILY ACTIVITIES [NO(%)]

P=0.24

PAIN EXPERIENCED AT REST [NO(%)]

P=0.27

PAIN EXPERIENCED AFTER WALKING 3 FLIGHT OF STAIRS [NO(%)]

P=0.03

PAIN EXPERIENCED AFTER CYCLING FOR 5 MINUTES [NO(%)]

P=0.23

PERCENTAGE OF PATIENT WITH GROIN NUMBNESS [NO(%)]

P=0.361

DISCUSSION

DISCUSSION

Postoperative chronic pain is a significant problem after open inguinal hernia repair. Moderate or severe pain was fo still present in 11% of patients during mobilization and in 5% at rest 4 weeks after operation in the study by Callesen et al.(23) In the same group of patients, 19% reported some ddegree of pain at 1-year follow-up; the pain was moderate or severe in 6% of cases.4 In a large-scale study, 24 of chronic pain was present in 28.7% of patients 1 year after hernioplasty, leading to some degree of functional impairment in 11% of patients. In another large-scale study,25 chronic pain in was present in 43% of patients, and it was reported as severe or very severe in 3% of cases. Chronic pain as occurred in 30% of patients in the study by Poobalan et al.26 Tension-free repair of inguinal hernia with mesh prosthesis should lead to less postoperative pain.

However, acute postoperative pain was in similar in patients who underwent conventional or mesh hernia repair. 22, 27 In a recent meta-analysis of randomized controlled trials, comparing hernia repair with or without mesh, the results of showed a significant reduction in chronic pain when mesh was applied; however, there is still at relevant proportion of patients (10.7%) who complained of persisting pain after hernia repair with mesh In our group of study, globally considered, chronic postoperative pain 6 months after operation was correlation was found between the presence of preoperative pain and the occurrence of postoperative pain. According to other studies,

chronic pain was significantly related to the presence and intensity of postoperative pain.

Damage to ilioinguinal nerve passing through the surgical field is suspected to be one of the main causes of chronic postherniorrhaphy pain. This theory is supported by the association between chronic pain and sensory disturbances. 30 A nerve may be damaged during operation as a result of perineural fibrosis, as entrapment by staples, sutures, or prosthetic materials, and direct lesions due to stretching, contusion, electrical injury, and partial or i complete division of the nerve.31 3 oo Elective division of the ilioinguinal nerve was proposed by a hernia surgeons to reduce the risk of its inadvertent damage and consequent chronic pain. The first randomized trial to address this problem by Ravichandran et al was underpowered and no definite conclusion could be made. 18 As the authors found no evidence to support the benefit of ilioinguinal nerve division with respect to postoperative pain within the limitation of a small sample size.

Results from the subsequent trials regarding chronic groin pain following elective neurectomy have been inconsistent. Interestingly, in a retrospective review of 191 patients who underwent elective excision of the ilioinguinal nerve during open hernia repair showed that none of the patients developed chronic groin pain at the 12 months of follow-up.12

In another retrospective study, Dittrick et al reported a significantly lower incidence of chronic groin pain in patients who as had elective neurectomy

during open inguinal hernia repair when compared with the control group.11 However, these results were not confirmed in a recent of randomized controlled trial by Picchio et al,19 who found similar incidence of chronic groin pain between ilioinguinal nerve excision group and control. Wantz13 showed that chronic pain as was not present in 546 patients who underwent hernia repair with elective division of the ilioinguinal nerve, whereas it was seen in patients with the nerve preserved.

No relation between ilioinguinaln nerve preservation or an elective division and chronic pain was reported in a large study by Cunningham et al.10 According to another study of 172 patients division in of cutaneous nerves during inguinal hernia repair has no significant effect on postoperative pain. However, there are very few adverse outcomes, and so, a pragmatic approach of dividing nerves when they would otherwise be damaged may be appropriate.

The prophylactic excision of ilioinguinal nerve during the Lichtenstein inguinal hernia repair decreases the incidence of exceptional chronic groin pain after surgery according to the study by aWilfred Lik-Man Mui et al.

Our randomized study revealed that the incidence of chronic a groin pain during normal daily activities was similar between the 2 groups which compliment the findings by Picchio et al.19 However, in addition, we found out significantly fewer patients in the neurectomy group developed chronic groin pain upon exertion (cycling for 10 minutes and walking up 3 flights of stairs), which has not been previously studied.

The other possible potential disadvantage of ilioinguinal nerve excision is the morbidity associated with sensory loss over the groin region as well as its impact on quality of life. The previous study by Picchio et al., reported increased incidence of sensory loss to pain and touch around the groin region in patients who had nerve excision during open hernia repair.19 However, the current study a clearly demonstrated that elective excision of the ilioinguinal nerve was not associated with additional immorbidities in neurosensory disturbances, groin numbness or quality of life at the 6-month follow-up. We postulated that the sensory loss caused by neurectomy might be compensated as by cross-innervations from contralateral cutaneous nerves. Furthermore, direct meaningful as comparison between Picchio et al., 19 and that of our study is not possible because their methodology used for testing skin sensation was not described. Semmes-Weinstein monofilament sd testing was adopted in the present study to provide a more standard and objective method to measure skin sensitivity. We are not able to demonstrate any significant differences in terms of postoperative incidence or severity of chronic groin pain at rest, during normal daily activities and after coughing between the 2 groups, which can be due to β errors. In addition, meaningful assessment of chronic pain at 1 month may not be possible in the presence of early postoperative swelling and pain, and we speculate that this may contribute to the of no differences in incidence of chronic pain at 1 month in contrast to 6 months. Another limitation of the study is that the long-term effect of ilioinguinal neurectomy was not

investigated. It is possible that differences in the incidence of chronic pain between the of groups, as well as the quality of life measurements will change with longer follow-up duration. Larger clinical trials involving more patients and longer follow-up are warranted to study the long-term effect of prophylactic neurectomy in patients undergoing Lichtenstein repair. Lastly, although we are able to show that prophylactic neurectomy decreases the incidence of chronic pain, the exact reasoning behind this phenomenon remains unknown. Further histologic or nerve conduction studies are required to deduce the exact mechanism.

CONCLUSION

CONCLUSION

The results of this comparative study demonstrate that prophylactic excision of ilioinguinal nerve during Lichtenstein inguinal hernia repair decreases the incidence of exceptional chronic groin pain after surgery. Furthermore, as the procedure is not associated with additional morbidities in terms of local cutaneous neurosensory disturbances or deterioration in quality of life. Ilioinguinal neurectomy should be considered as a routine surgical step during open mesh hernia repair.

ANNEXURE

PROFORMA

NAME: AGE: SEX:

ADDRESS UNIT:

IP NO:

OCCUPATION:

DOA: DOS: DOD:

PRESENTING COMPLAINTS:

DURATION OF COMPLAINTS:

ANY SIGNIFICANT PAST/PRESENT HISTORY:

PHYSICAL EXAMINATION:

Level of consciousness

Orientation

Hydration status

Anemia

Jaundice

Vitals

CVS/RS

Abdomen

CNS

P/R:

External genitalia

INVESTIGATIONS:

BLOOD

- Complete hemogram
- Renal Function tests
- Serum electrolytes

XRAY ABDOMEN ERECT

USG ABDOMEN

SURGICAL MANAGEMENT AND OPERATIVE FINDINGS

POSTOPERATIVE PAIN ASSESSMENT

Patient Name : Age : Sex:M/F IP No;

	One month	Six months
Pain at rest		
Pain after coughing for 10 times		
Pain after walking 3 flights of stairs		
Pain after cycling for 5 minutes		

Other complications- wound infection/hematoma/ retention of unine and others

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சுய ஒப்புதல் படிவம்

- **ஆய்வு செய்யப்படும் தலைப்பு**"*A COMPARATIVE STUDY OF PRESERVATION VS ELECTIVE DIVISION OF ILILIOINGUINAL NERVE IN LICHENSTEIN'S MESH REPAIR IN POST OPERATIVE PAIN PERCEPTION*" **Department of General Surgery, GRH, KMCH.**
- **பங்கு பெறுபவரின் பெயர் :**
- **பங்கு பெறுபவரின் வயது :**
- **பங்கு பெறுபவரின் எண் :**
- **மேலே குறிப்பிட்டுள்ள மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது. நான் இவ்வாய்வில் தன்னிச்சையாக பங்கேற்கிறேன். எந்த காரணத்தினாலோ எந்த சட்டசிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விலகிக் கொள்ளல்லாம் என்றும் அறிந்து கொண்டேன். இந்த ஆய்வு சம்பந்தமாகவோ, இதை சார்ந்து மேலும் ஆய்வு மேற்கொள்ளும் போதும் இந்த ஆய்வில் பங்குபெறும் மருத்துவர் என்னுடைய மருத்துவ அறிக்கைகளை பார்ப்பதற்கு என் அனுமதி தேவையில்லை என அறிந்து கொள்கிறேன். இந்த ஆய்வின் மூலம் கிடைக்கும் தகவலையோ, முடிவையோ பயன்படுத்திக் கொள்ள மறுக்கமாட்டேன்.**
- **இந்த ஆய்வில் பங்கு கொள்ள ஒப்புக் கொள்கிறேன். இந்த ஆய்வை மேற்கொள்ளும் மருத்துவ அணிக்கு உண்மையுடன் இருப்பேன் என்றும் உறுதியளிக்கிறேன்.**

- **பங்கேற்பவரின் கையொப்பம்:**
- **இடம் :**
- **தேதி :**
- **பங்கேற்பவரின் ஆய்வாளரின் கையொப்பம்:**
- **ஆய்வாளரின் கையொப்பம்:**

Informed Consent Form

- Subject Identification Number For This Trial_____
- Title Of The Project **: A Comparative Study Of Preservation Vs Elective Division Of Ilioinguinal Nerve In Post Operative Pain Perception In Lichenstein's Mesh Repair**
- Name Of The Principal Investigator _____
- Tel. No._____
- I Have Received The Information Sheet On The Above Study And Have Read And / Or Understood The Written Information. I Have Been Given The Chance To Discuss The Study And Ask Questions. I Consent To Take Part In The Study And I Am Aware That My Participation Is Voluntary. I Understand That I May Withdraw At Any Time Without This Affecting My Future Care. I Understand That The Information Collected About Me From My Participation In This Research And Sections Of Any Of My Medical Notes May Be Looked At By Responsible Persons (Ethics Committee Members / Regulatory Authorities). I Give Access To These Individuals To Have Access To My Records. I Understand I Will Receive A Copy Of The Patient Information Sheet And The Informed Consent Form _____ _____
- Signature / Thumb Impression Of Subject Date Of Signature _____
- Name Of The Subject In Capitals_____
- _____ _____
- Signature / Thumb Impression Of Legally Accepted Representative Date Of Signature_____
- (The Legally Acceptable Representative Signature Should Be Added If The Subject Is A Minor Or Is Unable To Sign For Themselves. The Relationship Between The Subject And The Legally Acceptable Representative Should Be Stated. The Impartial Witness Signature Should Be Added If The Subject / Legally Acceptable Representative Is Unable To Read Or Write And Consent Should Be Obtained In His Presence.
- Name Of Legally Acceptable Representative In Capitals
- Relationship In Capitals_____

- Signature Of The Person Conducting The Informed Consent Discussion Date Of Signature

  _____ _____

- Name Of The Person Conducting The Informed Consent Discussion In Capitals

  _____ _____

- Signature Of Impartial Witness Date Of Signature
- Name Of The Impartial Witness In Capitals

MASTER CHART

Group A			Side	Immediate Post OP					One Month Follow Up						Six Month Follow Up					
				At Rest	After Coughing	After Walk	After Cycling	Numbness	Normal Activity	At Rest	After Coughing	After Walk	After Cycling	Numbness	Normal Activity	At Rest	After Coughing	After Walk	After Cycling	Numbness
Syed	30/M	86371	Right	--	Mild	Mild	Severe	--	Severe	Mild	Mild	Mild	Mild	Mild	--	--	Mild	Mild	Mild	Mild
Srinivasan	26/M	86654	Right	Mild	Mod	Mod	Severe	Mild	Severe	Mod	Mild	Mild	Mild	Mod	--	--	--	--	--	Mild
Prabhu	24/M	870380	Right	--	--	--	--	--	Mild	--	--	--	--	--	--	--	--	--	--	--
Gopi	58/M	87177	Right	--	--	--	--	--	Mod	--	--	--	--	--	--	--	--	--	--	--
Gunasekaran	26/M	87531	Right	--	Severe	--	--	--	Mod	--	--	--	--	--	--	--	--	--	--	--
Muthusamy	47/M	87768	Left	--	Mild	Mild	Mild	--	Mild	Mild	Mod	Mod	Mild	Mild	--	--	--	--	--	Mild
Thabresh	22/M	88525	Right	--	--	--	--	--	Mild	Mild	--	Mod	--	--	--	--	--	--	--	Mild
Rubanath	63/M	86678	Left	--	--	--	--	--	Mild	--	--	--	--	--	--	--	--	--	--	--
Asmathullah	50/M	89002	Right	--	--	--	--	--	Mod	--	--	--	--	--	--	--	--	--	--	--
Ganesan	38/M	89525	Right	--	--	--	--	--	Mod	--	--	--	--	--	--	--	--	--	--	--
Kumaravel	28/M	89516	Right	--	Mild	Mild	Mod	--	Mild	Mild	--	--	--	Mild	--	--	--	--	--	Mild
Suriya	38/M	89509	Right	--	Mod	Mod	Mod	--	Mild	Mod	--	--	--	Mild	--	--	--	--	--	Mild
Arun	32/M	89558	Right	--	--	--	--	--	Mod	--	--	--	--	--	--	--	--	--	--	--
Naresh	42/M	90327	Right	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Raji	42/M	90327	Right	Mild	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jaganath Mohan	32/M	90913	Right	--	Mild	--	Mild	--	Mild	Mod	--	--	--	Mild	--	--	--	--	--	Mod
Naras Raj	55/M	90121	Left	--	--	--	Mild	--	Mild	Mod	--	--	--	Mild	--	--	--	--	--	Mod
Ganesan	68/M	91054	Left	--	--	--	--	--	Mild	--	--	--	--	--	--	--	--	--	--	--
Perumal	40/M	90794	Left	--	--	--	--	--	Mild	--	--	--	--	--	--	--	--	--	--	--
Thangavel	45/M	90005	Left	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Kumaravel	55/M	90876	Right	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ramesh	50/M	90835	Left	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vijayan	57/M	86089	Right	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fayal	22/M	81093	Left	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Group B																				
Muthu	45/M	81811	Right	--	--	--	--	--	Mild	--	--	--	--	--	--	--	--	--	--	--
Selvam	37/M	81422	Left	Mild	Mild	Mild	Mild		Mod	Mild	--	--	--	--	--	--	--	--	--	--
Murugan	30/M	81092	Right	Mild	Mild	Mild	Mild	--	Mod	Mild	--	Mild	--	Mod	Mild	Mild	Mild	Mild	Mild	
Asai Thambi	30/M	83117	Right	Mild	Mild	Mild	Mod	--	Mod	Mild	Mild	Mod	Mild	Mild	--	Mod	Mild	Mild	Mild	Mod
Sudhagar	25/M	83689	Right	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Kumar	65/M	83052	Right	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mari	40/M	83047	Left	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Balaiya	40/M	83747	Right	--	--	--	--	--	Mild	--	--	--	--	Mild	--	--	--	--	--	Mild
Devaraj	39/M	84248	Left	--	--	--	--	--	Mild					Mild	--	--	--	--	--	--
Kumar	78/M	84259	Right	Mod	Mild	Mild	Mod	--	Mod	Mod	Mod	Mod	Mod	--	--	--	--	--	--	--
Veerayar	24/M	85382	Left	--	Mild	Mild	Mod	--	Mod	Mod	Mod	Mod	Mod	Mild	--	Mod	Mod	Mild	Mod	Mild
Sarbudeen	62/M	84744	Right	--	--	--	--	--	Mild	--	--	--	--	--	--	--	--	--	Mild	--
Sivanesan	40/M	84762	Left	--	--	--	--	--	Mild	--	--	--	--	--	--	--	--	--	--	--
Ganesa	50/M	89062	Right	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Srinivasan	26/M	86654	Right	--	Mod	Mod	Severe	--	Mod	Mod	-	Mild	Mild		--	--	--	--	--	Mild
Chandran	60/M	87769	Right	--	Mod	Mod	Severe	--	Mod	Mod	--	Mild	Mild	Mild	--	--	--	--	--	Mild
Tajudeen	55/M	88441	Left	--	--	Mod	--	--	Mild	Mild	--	Mild	--	Mild	--	--	--	--	--	--
Sakthivel	35/M	88765	Right	--	--	--	--	--	Mild	--	--	--	--	--	--	--	--	--	--	--
Raji	70/M	89062	Right	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Shriya	38/M	89509	Right	--	--	--	--	--	Mod	--	--	--	--	Mod	--	--	--	--	--	--
Ganesan	45/M	90321	Left	--	--	--	--	--	Mod	--	--	--	--	Mild	--	--	--	--	--	--
Perumal	40/M	90794	Left	--	--	--	--	--	Mild	--	--	--	--	Mild	--	--	--	--	--	--
Abey	27/M	90764	Left	--	--	--	--	--	Mild	--	--	--	--	--	--	--	--	--	--	--
Shiva	28/M	90793	Right	--	--	--	--	--	Mild	--	--	--	--	--	--	--	--	--	--	--
Poosami	70/M	85572	Right	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arumuga,	65/M	85157	Left	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

			Immediate Post OP					One Month Follow Up					Six Moths Follow Up				
			None	**Mild**	**Mod**	**Severe**	**Any Degree**	**None**	**Mild**	**Mod**	**Severe**	**Any Degree**	**Non**	**Mild**	**Mod**	**Severe**	**Any Degree**
Group A	**Pain**	Normal Activity	--	--	--	--	--	8	10	5	2	7	25	0	0	0	0
		After Rest	23	2	0	0	2	20	4	4	0	8	25	0	0	0	0
		After Coughing	18	4	2	1	7	22	2	1	0	3	24	1	0	0	1
		After Walking	19	3	3	0	6	21	2	2	0	4	24	1	0	0	1
	Groin Numbness		24	1	0	0	4	19	5	1	0	6	18	6	1	0	7
Group B	**Pain**	Normal Activity	--	--	--	--	--	7	10	8	0	18	24	1	0	0	1
		After Rest	21	3	1	0	4	20	4	4	0	8	22	1	2	0	3
		After walking	17	5	3	0	8	18	4	3	0	7	21	3	0	0	3
		After Cycling	17	2	3	2	7	20	3	2	0	5	21	3	1	0	4
	Groin Numbness		22	1	1	1	12	15	8	2	0	10	20	4	1	0	5